

**New Records, Species, and Genera of Caseyid Millipeds  
from the Pacific Coast of North America  
(Diplopoda: Chordeumatida: Caseyidae)**

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Millipeds of the family Caseyidae occur abundantly in temperate forests of the Pacific Coastal states and British Columbia, with one species of the genus *Underwoodia* in northeastern North America (Shelley, 1988) and forms of undetermined status in Alberta, Manitoba, North Dakota, Wyoming, Utah, and New Mexico (Fig. 219). Chamberlin (1925) proposed two species for the Utah caseyids and placed them in *Underwoodia*; along with the other undetermined forms, they are currently under study by the junior author. On the Pacific Coast, caseyids inhabit moist duff on the forest floor and occur primarily in pure stands of oak, madrone, and maple, or where these are mixed with digger pine, yellow pine, and redwood; occasional specimens are found in red cedar and spruce litter. They are prominent during the wet season, October to April, in California.

The family Caseyidae belongs to the order Chordeumatida, which received only scattered attention in the Nearctic realm until the reclassification by Shear (1972). He divided the 10 North American families among four superfamilies and placed the Caseyidae in the Striarioidea with the Rhiscosomididae, Striariidae, and Urochordeumatidae. On a global basis Hoffman (1979) opposed the Striariidae to all

other chordeumatoids and recognized two suborders—Striariidea and Chordeumatidea. He divided the latter into nine superfamilies, with the Caseyidae being one of six families of uncertain affiliation. Both Shear and Hoffman agree with Causey (1963) that the Underwoodiidae is a synonym of the Caseyidae, but Shear recognized one more genus (seven) as Hoffman assigned *Placerna* to synonymy under *Caseya*. We concur in these synonymies and also place *Zantona* under *Caseya*. However, we confirm *Vasingtona* and propose two new genera, which bring the family's composition to seven genera as follows: *Underwoodia* Cook and Collins; *Caseya* Cook and Collins; *Vasingtona* Chamberlin; *Opiona* Chamberlin; *Speoseya* Causey; and *Ochrogramma* and *Metopiona*, new genera.

This study began as a revision of western caseyids by the first author in partial fulfillment of the Doctor of Philosophy degree requirements at the University of California at Davis and was continued by the second author, who incorporated new records from the major North American myriapod collections and gained access to type specimens that were previously unavailable. Most of the latter were originally in the private collection of the late Ralph V. Chamberlin at the University of Utah and became available in the 1970's after its transferral to the National Museum of Natural History, Smithsonian Institution (NMNH). A few non-type specimens were already housed at the NMNH but could not be located until the collection was reorganized in the 1980's. There is a general dearth of material of *Speoseya*, known only from the type specimens of the type species, *S. grahami* Causey, and *Underwoodia* is being reviewed by the second author. Thus, except for inclusions in the historical summary and general discussions of distributions, treatments of these taxa are deferred to future studies. This contribution is therefore limited to the chiefly epigeal caseyids occurring along the Pacific Coast from Los Angeles to southern British Columbia, the region of greatest species diversity in the family.

In his assessment of the Caseyidae, abbreviated in deference to the present study, Shear (1972) noted that the family was "very probably a large one in number of species." Through extensive field collecting in California by the senior author and J. S. Buckett, and the loan by Dr. Shear of a large quantity of material from Oregon and Washington collected by Ellen M. Benedict, Portland State University, we report 30 undiagnosed species and six new subspecies from over 1000 specimens examined. Coupled with the 14 established species we consider valid, including those of *Underwoodia* and *Speoseya*, the Caseyidae ranks as the third most diverse Nearctic chordeumatoid family with 44 known species, behind the Conotylidae and the Cleidogonidae (with about 50 and 100 known species, respectively), and ahead of the Trichopetalidae (with approximately 20 known species). With the discoveries of males from New Mexico, Utah, and Alberta, and females and juveniles from the northern Great Plains, a continental distribution can now be reported for the Caseyidae. Several new species and possibly new genera can be expected from these areas, and additional fieldwork along the west coast may produce more Pacific species. The Caseyidae may therefore surpass the Conotylidae and rank second to the Cleidogonidae in the number of component species, although as noted by Shear (1972), the Striariidae, widespread in both the Atlantic and Pacific states, may also have a large number of species.

This contribution includes diagnoses of *Vasingtona*, *Ochrogramma*, *Opiona*, *Metopiona*, and *Caseya* with descriptions, redescriptions, diagnoses, and pertinent

illustrations of all valid species-group taxa. For agreement in gender with the genus, *C. heteropus* is changed to *heteropa*, and since *douglasia* was originally proposed, it is the correct name for this species instead of *douglasi*. All pertinent holotypes were examined, and the identity of each nominal species is satisfactorily resolved. In the ensuing species accounts, type specimen notations are always of the senior synonym. The first author prepared Figures 2–211, including the type specimens available to him; those which the second author gained access to later are depicted in Figures 212–218, and the drawings of *Opiona siliquae* Causey are necessarily out of sequence. For simplicity in the type and general locality listings, the initials EMB denote material collected by Ellen M. Benedict; in the latter, collectors' names are omitted for specimens taken by the senior author, J. S. Buckett, and assistants. Acronyms for sources of preserved study material are as follows:

AMNH—American Museum of Natural History, New York, NY;  
 CAS—California Academy of Sciences, San Francisco, CA;  
 CIS—California Insect Survey, University of California at Berkeley;  
 FSCA—Florida State Collection of Arthropods, Gainesville, FL;  
 MCZ—Museum of Comparative Zoology, Harvard University, Cambridge, MA;  
 NCSM—North Carolina State Museum of Natural Science, Raleigh, NC;  
 NMNH—National Museum of Natural History, Smithsonian Institution, Washington, DC;  
 PMBC—Provincial Museum of British Columbia, Victoria, BC, Canada;  
 RLH—Private collection of Richard L. Hoffman, Radford, VA;  
 UCD—Bohart Entomological Museum, University of California at Davis;  
 WAS—Private collection of William A. Shear, Hampden-Sydney, VA.

#### LITERATURE REVIEW

The families Caseyidae and Underwoodiidae were erected by Verhoeff (1909), one page apart, for two species described by Cook and Collins (1895): *Caseya heteropus*, from California, and *Underwoodia polygama*, from New York. *Underwoodia*, the older generic name, also included the Ontario species *U. iuloides* (Harger, 1872), which Cook and Collins transferred from *Trichopetalum*. The following year Chamberlin (1910) proposed *C. irritans*, from Portland, Oregon, and in 1925 he named two Utah species of *Underwoodia*, *tida* and *hespera*, which are under review by the junior author.

Verhoeff (1932) listed both families in his summary of higher Nearctic taxa and included *Bactropus* in the Underwoodiidae. However, he either ignored or was unaware of Chamberlin's work, as his geographical statements reflect the knowledge of 1909.

Chamberlin (1941a) described *C. fasciata* from Washington, and 2 mo later (1941b) he designated it the type species of the new genus *Vasingtona*. In the latter paper Chamberlin also proposed *C. sequoia*, from Sequoia National Park, California, and the new genera *Placerna* and *Zantona* for *P. dorada* and *Z. douglasia*, two new species from east-central California and southern Oregon, respectively. In 1947 Chamberlin described *C. dynotypa*, from Monterey County, California.

In the ensuing decade Chamberlin and Hoffman (1950) transferred *Bactropus*

into its own family but erroneously reported that it came from the Cleidogonidae. Subsequently the first author (Chamberlin, 1951) erected *Opiona* for the first west-Canadian caseyid, *O. columbiana*, from Victoria, British Columbia. In 1952 Chamberlin added *C. bentona*, from central Oregon and Palmen (1952) reported two localities for *U. polygama* in Labrador and around 37 in Newfoundland, where it is the dominant diplopod. In the same year Causey (1952) described the southernmost caseyid, *C. similis*, from Kern County, California, and 2 yr later she (1954) proposed a second species of *Opiona*, *O. hatchi*, from Seattle, Washington. Causey (1955) recorded new localities for *C. sequoia* in Mariposa and Tuolumne counties, California, which are questionable since they are well north of the type locality and are based on a female and immature male. Chamberlin and Hoffman (1958) summarized knowledge of the Caseyidae and Underwoodiidae in their continental checklist, misspelling *Z. douglasia* as *douglasi* and *C. dynotypa* as *dynopta*, the latter subsequently noted by Loomis (1966).

The decade of the 1960's began with an important paper by Causey (1963). She synonymized the Underwoodiidae with the Caseyidae and published an interpretation of caseyid gonopods that was refuted by Shear (1972). She also proposed the genus *Speoseya* for *S. grahami*, a new species from a cave in central California, and described the third species of *Opiona* and the first from California, *O. siliquae*. Buckett (1964) listed all the California caseyids including four species of *Caseya* and one each of *Placerna*, *Opiona*, and *Speoseya*. Loomis (1966) described *C. coxalis*, from Santa Cruz County, California, and clarified the structure of the posterior gonopods of *C. similis*, as well as noting the aforementioned misspelling of *dynotypa* by Chamberlin and Hoffman (1958).

The first inclusive effort in the Caseyidae aside from lists was that of Shear (1972). He presented a generic range map comparing the known distribution of *Underwoodia* in the northeastern United States and Canada with that of the rest of the family along the Pacific Coast from southern California to mainland British Columbia, omitting Vancouver Island. He also omitted the Utah localities of *Underwoodia* reported by Chamberlin (1925), and since the type specimens are immature females, suggested that they probably do not belong to this genus. Shear also clarified the gonopodal misconceptions of Causey (1963), forming the basis for this study. Hoffman (1979) synonymized *Placerna* with *Caseya* but recognized all the other genera though questioning *Vasingtona* and *Zantona*. The final publications involving caseyids concern the Canadian fauna. Kevan (1983) summarized the known and potential Canadian caseyids, and in a report on east-Canadian millipeds, Shelley (1988) placed *U. polygama* in synonymy under *U. iuloides*, thereby formalizing the suggestions of Palmen (1952) and Shear (1972).

Thus at this writing the Caseyidae consists of the following six genera and 17 species, listed chronologically below with their type localities and other reported occurrences. The composition of each genus is essentially as cited by Hoffman (1979), who reported "about seven nominal species" for *Caseya*.

Genus *Underwoodia* Cook and Collins, 1895.

*U. iuloides* (Harger, 1872). "Simmon's" (probably a misspelling of Simon's) Harbor on the north shore of Lake Superior, Ontario, Canada. Also known from two localities in Labrador and 37 in Newfoundland (Palmen, 1952; Shelley, 1988); seven other sites in Ontario (Cook and Collins, 1895; Judd,

1967; Shelley, 1988); three in Quebec and one in Nova Scotia (Shelley, 1988); Sullivan Co., NH (Shelley, 1988); Keewenaw, Marquette, Delta, and Jackson cos., MI (Shelley, 1988); Fon Du Lac Co., WI (Shelley, 1988); and Syracuse, Kirkville, Marcellus, Centerport, Huntington and Cold Spring Harbor, NY (Cook and Collins, 1895).

“*U.*” *tida* Chamberlin, 1925. Logan Canyon, Cache Co., UT. As noted by Shear (1972) this species probably does not belong in *Underwoodia*.

“*U.*” *hespera* Chamberlin, 1925. Mill Creek Canyon, Salt Lake Co., UT. A probable synonym of the preceding name.

Genus *Caseya* Cook and Collins, 1895 (= *Placerna* Chamberlin, 1941b).

*C. heteropus* Cook and Collins, 1895. Around San Francisco Bay, California, exact locality unknown but probably in Marin Co.

*C. irritans* Chamberlin, 1910. Portland, Multnomah Co., OR.

*C. sequoia* Chamberlin, 1941b. Sequoia National Park, Tulare Co., CA. Also reported from Briceburg, Mariposa Co., and Sonora Pass, Tuolumne Co., CA (Causey, 1955; Buckett, 1964).

*C. dorada* (Chamberlin, 1941b). 9 mi N Placerville, Eldorado Co., CA.

*C. dynotypha* Chamberlin, 1947. Hasting's Reservation, Monterey Co., CA.

*C. similis* Causey, 1952. Tehachapi Pass, Kern Co., CA. Also known from Woodford, north of Tehachapi Pass (Loomis, 1966).

*C. bentona* Chamberlin, 1952. Mary's Peak, Benton Co., OR.

*C. coxalis* Loomis, 1966. Davenport, Santa Cruz Co., CA.

Genus *Zantona* Chamberlin, 1941b.

*Z. douglasia* Chamberlin, 1941b. “John Day Creek,” Douglas Co., OR.

Genus *Vasingtona* Chamberlin, 1941b.

*V. fasciata* (Chamberlin, 1941a). Arlington, Snohomish Co., WA.

Genus *Opiona* Chamberlin, 1951.

*O. columbiana* Chamberlin, 1951. Victoria, Vancouver Island, British Columbia, Canada.

*O. hatchi* Causey, 1954. Carkeek Park, Seattle, King Co., WA. Also known from the University of Washington campus, Seattle (Causey, 1954).

*O. siliquae* Causey, 1963. Fault Rock Cave, Mendocino Co., CA.

Genus *Speoseya* Causey, 1963.

*S. grahami* Causey, 1963. Shaw's Cave, Calaveras Co., CA.

#### ANATOMY AND TAXONOMIC CHARACTERS

As noted by Shear (1972), caseyids resemble in general facies the Mexican and eastern Nearctic genus *Cleidogona* (Cleidogonidae). Both have 30 smooth cylindrical segments that taper at the ends of the body and lack knobs, rugae, and paranota. The mentum of the gnathochilarium is divided, but the ventrolateral pleurotergal striations are more pronounced in caseyids, and males in this family are distinguished by the incrassate, two-segmented posterior gonopods, which interrupt the leg sequence in lateral view (Fig. 1; Palmen, 1952: fig. 8). The telopodite of this structure has only one segment, is broad or flattened laterad, and appears to be wedged between the 7th and 10th legs. In larger forms this

feature is visible to the unaided eye and allows for accurate family determinations in the field. Like *Cleidogona*, most species of *Caseya*, *Opiona*, and *Metopiona* have a mottled brown base color dorsally with irregular lighter patches, but *Vasingtona* and *Ochrogramma* display a conspicuous, yellow, middorsal stripe.

A striking modification in the Caseyidae is the ventral expansion of the mandibular stipes in males of *Vasingtona* and *Ochrogramma* (Figs. 18, 44). The margins of these laminae are variably rounded and press against the sides of the collum when the millipeds coil, probably helping to protect the more vulnerable ventral parts.

Dorsally, each caseyid diplosegment has three pairs of setae. The collum is narrower than the head and does not extend as far ventrad as the succeeding segments. In *Vasingtona* there is an anterior ovoid submarginal depression on pleurotergite 2, which appears to receive the ventral corner of the collum during coiling. In general, the margins of the anterior pleuroterga vary from gently rounded to sublinear, but in two species of *Opiona* there is a slight marginal indentation or concavity on pleurotergite 3. The 4th pleurotergite extends ventrad, and the margin may be rounded, truncate, slightly indented or concave, acute, or falcate.

In males, the tarsi of the first legs have a mesal row of stiff erect setae which may or may not be present on the second tarsi (Figs. 12, 45). The gonapophyses arise from the second coxae and are unusual in assuming taxonomic importance. In most caseyids, as in other Nearctic chordeumatoids, they are relatively short, no more than half the length of the second telopodites (Figs. 50, 127, 128, 140, 141, 153, 170), but in *Vasingtona* and *Ochrogramma*, the gonapophyses are very long, equal to or longer than the second telopodites, and curve caudad between the third legs (Figs. 13, 46). The coxa of leg 7, the caudalmost pregonopodal leg, extends ventrad beyond the telopodite articulation in *Caseya* and *Ochrogramma* and has one or more projections in the former (Figs. 48, 150).

The anterior gonopods in the Caseyidae extend caudad between the posterior gonopods and are mostly obscured in situ by the broad telopodite of the latter (Fig. 1). They are extremely complex, and this is particularly true of *Caseya*, whose discussion is facilitated by the "exploded" views (Figs. 113–117) of that of *C. heteropa disjuncta* (Figs. 111, 112). *Opiona* and *Metopiona* have a lateral sternal plate, which covers the base of the flagellocoxite in lateral view and has a lateral process which extends distad in *Opiona* (Fig. 85) but not in *M. sheari*. In *Vasingtona* and *Ochrogramma* the sternum is extensive and well sclerotized (Figs. 3–5, 20–24). In the former it articulates with the coxa and telopodite laterally by a pyramidal process (Fig. 2), and there is a small articulating sclerite with two setae between the latter and the telopodite. Likewise in *Ochrogramma*, the sternum articulates with the coxa by means of a sternal process, but there is no articulating sclerite. Instead there is a large, rounded, intergonopodal sclerite (Fig. 33), which joins the sternal arms caudally and is independent of the coxae. In *Caseya* a strong sternal band is fused to the coxal plate; thus articulation points and processes are absent.

The anterior gonopod coxae consist of a basal plate from which two coxites, a dominant colpocoxite and a smaller flagellocoxite, arise in all genera except *Vasingtona*. *Caseya* also has additional lateral and mesal laminae (Figs. 115, 116). The flagellocoxite assumes various forms, being comprised of a spherical sclerite in *Caseya*, which gives rise to a long, tapered flagellum. The latter curves distad

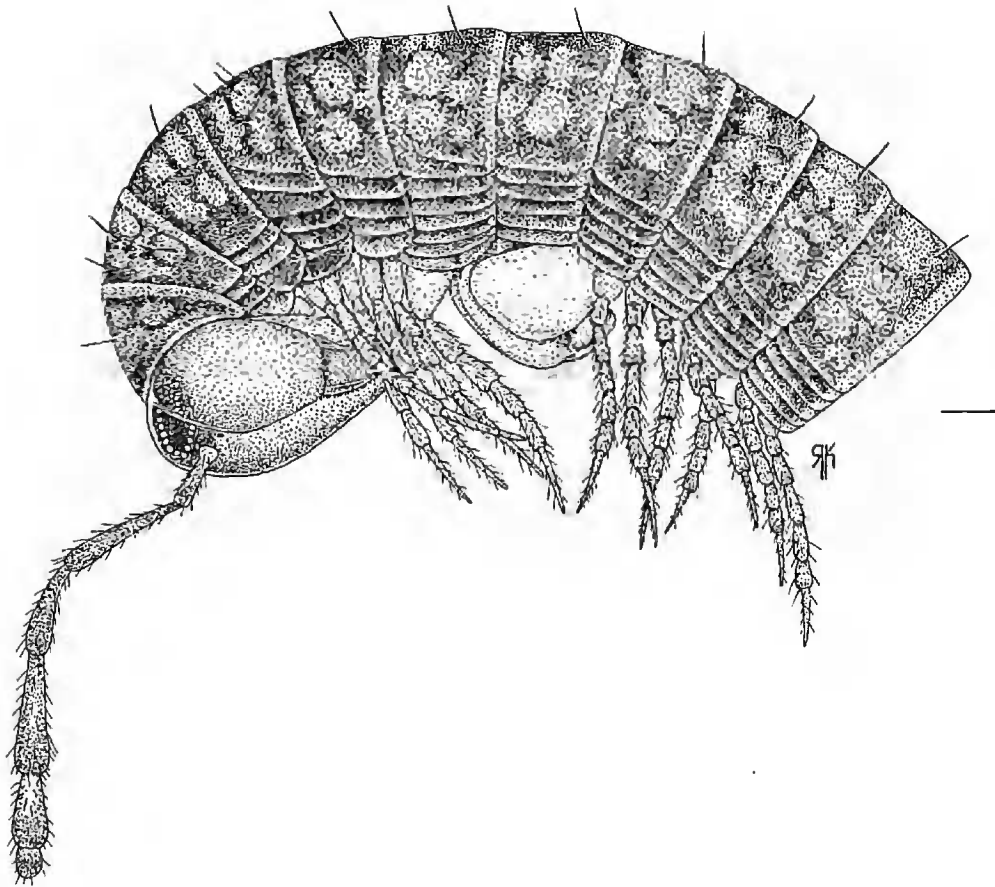


Figure 1. Lateral view of head and anterior segments of *Caseya h. heteropa* male from Monterey Co., CA. Scale line = 300  $\mu$ m.

within a groove in the colpocoxite, is shielded distally by both the lateral and mesal laminae, and is supported by flanges or "guides" on the intermediate septum of the telopodite (Fig. 114). In *Ochrogramma*, from one to five flagella join basally, are exposed in lateral view, and may be apically bifurcate or give rise to filiform projections (Figs. 20–24). Except for *Opiona confusa*, where it consists of two lanceolate structures, the flagellocoxite in *Opiona* consists of a large basal lobe from which numerous filiform flagella arise (Figs. 79, 85). *Metopiona sheari* bears two elongated styles on a pedicel (Figs. 96, 98, 99). The anterior style is free, and the caudoventral one lies in a groove on the colpocoxite. The pedicel fits into a socket and can rotate from vertical to horizontal, causing the caudoventral style to move up and down in the groove and the anterior style to move at right angles to the pedicel.

The colpocoxites, the largest and most prominent of the anterior gonopod structures, attach anteriolaterally to the coxal plates and extend caudad in situ over the sternum of the posterior gonopods, inserting near the coxae of the 10th legs. They may touch, be separated by only a narrow gap (Fig. 112), or be widely apart (Fig. 34). In *Opiona fisheri* they fit together through complementary notches in the mesal margins. The configuration of the colpocoxite is of primary taxonomic importance, and close attention should be paid to the projections, teeth, and lamellae, arising from its surfaces. In *Vasingtona* the colpocoxite is divided into three immobile processes that are fused anteriorly (Fig. 4): a curved anterior process, a long, apically glabrous and falcate mesal process, and a broad, truncate posterior process.

The telopodite of the anterior gonopod joins the coxal plate posteriorly. Typically a simple, soft or poorly sclerotized lobe (Figs. 4, 79, 85), it is petiolate in



*Ochrogramma* (Figs. 20–24) and three species of *Opiona* (Figs. 77, 82, 91), and absent from *Metopiona*. In *Caseya*, a thin lamina, the intermediate septum, arises from the anterior margin and possesses two small flanges or flagellar “guides,” which support the distal extremities of the flagella (Fig. 117).

On the posterior gonopods, the sternum is narrow except in *Caseya*, where it is broad and extends to the lateral margins of the coxae. The coxae are relatively broad and have a medial endite of variable configuration, which is taxonomically important. The single-segmented telopodite is basally broad in *Vasingtona* and *Ochrogramma*, petiolate in *Caseya* and some species of *Opiona* (Figs. 87, 92a, 123, 126), and flattened in other species of the latter (Figs. 72, 75). It has a lateral sulcus in *Vasingtona* (Figs. 16, 17) and a marginal rim in some species of *Caseya* (Fig. 162).

The female cyphopods are situated caudad to the coxae of the second legs in a cavity formed by the latter and the sternum (Fig. 8). They consist of lateral and mesal valves with a central oviduct pore (Figs. 35, 104, 200). The valves are fused caudally in *Vasingtona* and *Caseya* and form a level platform in the former, in which the lateral valve continues into a large caudolateral process (Figs. 6, 7). The mesal valve is usually larger in *Opiona*, and ventral projections arise from both valves in *Ochrogramma* (Fig. 39). Each cyphopod has a pair of slender bars anteriorly that comprise the receptacle. In *Vasingtona* they are hinged laterally and have a median vertical sclerite (Fig. 6). The receptacle is uniform in *Caseya* and *Opiona* except for being slightly larger in *O. siliquae* and a few other species (Fig. 109). In *Vasingtona* the caudal surface of the cyphopod is covered by an irregular lamina, the postgenital plate (Fig. 6), which is absent from the other genera.

Segment 3 varies in females. The sternum tends to be broad and platelike with a short mesal projection (Figs. 9, 37, 102, 199). In *Ochrogramma* and *Opiona* there are flattened areas on the anterior surfaces of the sterna and ventrally directed lateral projections (Figs. 37, 102). The third legs are normal in all genera and may or may not be separated by the sternal process. Females of *M. sheari* are unknown.

#### Family Caseyidae Verhoeff

Caseyidae Verhoeff, 1909:567; Attems, 1926:11; Chamberlin, 1941a:22; 1941b:10; 1947:9; 1951:8; 1952:2; Causey, 1952:113; 1954:81; 1955:90; 1963:193; Chamberlin and Hoffman, 1958:87; Buckett, 1964:13; Loomis, 1966:225; Shear, 1972:258–260; Hoffman, 1979:137; Kevan, 1983:2967.

Underwoodiidae Verhoeff, 1909:568; Attems, 1926:12; Chamberlin and Hoffman, 1958:107; Judd, 1967:194.

*Type genera.*—Of Caseyidae, *Caseya* Cook and Collins, 1895; of Underwoodiidae, *Underwoodia* Cook and Collins, 1895.

*Diagnosis.*—Adults with 30 segments; body subcylindrical; dorsum with setae but without paranota, carinae, and tubercles; pleuroterga with lateral striae, extending onto dorsum of midbody segments; mentum divided; anterior gonopod with or without flagellocoxite and variable telopodite; posterior gonopod coxa usually with well-developed endite; telopodite with but one segment, expanded laterally.

*Description.*—Head with epicranial suture distinct, ending between ocelli. An-

tennae moderately long, not clavate. Ocelli present or absent. Facial setae sparse or dense. Mandibular stipes with or without ventral lamina. Mentum divided.

Body with 30 segments, tapering gradually at both ends. Pleuroterga cylindrical, smooth dorsally, with ventrolateral striae. Dorsal setae present, fine to spatulate.

Pregonopodal legs of males: Leg 1 small, podomeres usually robust, tarsus with mesal comb. Leg 2 similar or much smaller; gonapophysis varying from short and not extending beyond prefemur to longer than telopodite. Leg 3 coxa extending ventrad beyond telopodite articulation into rounded lobe; telopodite moderately long to very short. Leg 7 coxa enlarged or not, with or without processes.

Anterior gonopod sternum with or without variable lateral process. Coxa with one to four of following coxites arising from basal plate: colpocoxite, flagellocoxite, and lateral and mesal laminae. Telopodite present or absent, simple or large and broadly rounded. Posterior gonopod sternum narrow, length varying. Coxa with prominent endite mesal to telopodite. Latter comprised of one segment, expanding laterad. Leg 10 coxa with large mesal vesicle.

Leg 2 of females normal or reduced. Cyphopod valves equal or unequal, fused or free, sclerotized. Receptacle relatively small, well sclerotized. Postgenital plate usually absent.

*Distribution.*—The Caseyidae occurs principally along the Pacific Coast from Los Angeles to southern British Columbia and in the northeastern United States and eastern Canada, regions segregated by over 1200 miles. However, scattered samples from the intervening area indicate a continental distribution for the family (Fig. 219). The Pacific fauna is diverse, containing six genera and 40 known species, and extends some 1050 mi; the eastern fauna contains only one species, *Underwoodia iuloides*, which ranges from Newfoundland and southern Labrador to western Michigan and Wisconsin, and as far south as Long Island, New York (Shelley, 1988).

Excepting the cavernicolous male of *V. irritans* from Harney County, Oregon, none of the western caseyids are known east of the Sierra Nevada and Cascade Mountains. They hug the Pacific coastline, extending up the western slopes of these ranges but not across the divides, reflecting a preference for the moist coastal environments. The diversity is dramatically lower north of the Columbia River, the only watercourse completely bisecting the region in an east–west direction. Only four species occur north of this boundary in Washington and British Columbia, as opposed to 18 to the south in Oregon, and only *V. irritans* traverses the boundary. The most speciose genera, *Opiona* and *Caseya*, extend throughout the region, whereas the others are more restricted. The single species of *Vasingtona* is widespread in Washington and Oregon, but *Metopiona* and *Speoseya* are known only from a single species and locality. *Ochrogramma*, *Opiona*, and *Caseya* include a number of localized species and a few widespread ones: *Ochrogramma bentona*, *Opiona communis*, and *C. heteropa*.

*Relationships.*—A cladistic hypothesis of the Caseyidae cannot be attempted with present knowledge. Neither *Speoseya* nor *Underwoodia* can be placed, and synapomorphies are known only for *Vasingtona* plus *Ochrogramma* (ventral mandibular lamellas, long gonapophyses), probably sister genera. The former is distinguished by the branching colpocoxite, absence of the flagellocoxite, and presence of the postgenital plate on the cyphopods; the latter is unique in its basally divided flagellocoxite. *Caseya* (mesal and lateral laminae of the anterior gono-

poes), *Metopiona* (absence of the anterior gonopod telopodite and unique flagellocoxite), and *Opiona* (sternal process of the anterior gonopods) are also defended by autapomorphies.

#### KEY TO THE PACIFIC CASEYID GENERA

(based primarily on male characters)

1. Mandibular stipes with prominent ventral lamina; gonapophyses longer than 2nd telopodites, curving between third legs; dorsum with broad, middorsal yellow stripe ..... 2  
Mandibular stipes not modified; gonapophyses not as above; dorsum usually without yellow stripe ..... 3
2. Body large, exceeding 15 mm; anterior gonopod without flagellocoxite; colpocoxite with at least three branches (Figs. 3–5) .....  
..... *Vasingtona* Chamberlin  
Body smaller, less than 15 mm; anterior gonopod with flagellocoxite and narrow flagella; colpocoxite not divided (Figs. 20–24) .....  
..... *Ochrogramma*, new genus
3. Anterior gonopod without telopodite (Figs. 96, 98, 99) .....  
..... *Metopiona*, new genus  
Anterior gonopod with telopodite ..... 4
4. Anterior gonopod with lateral sternal process ..... *Opiona* Chamberlin  
Anterior gonopod without sternal process ..... 5
5. Anterior gonopod with mesal and lateral laminae, flagellocoxite developed as a pair of long, thin filaments; eyes numerous ... *Caseya* Cook and Collins  
Anterior gonopod without mesal and lateral laminae; flagellocoxite otherwise; eyes few or absent ..... *Speoseya* Causey

#### Genus *Vasingtona* Chamberlin

*Vasingtona* Chamberlin, 1941b:12; Chamberlin and Hoffman, 1958:89; Jeekel, 1971:84; Hoffman, 1979:138; Kevan, 1983:2968.

*Type species.* — *Caseya fasciata* Chamberlin, 1941a, by original designation.

*Diagnosis.* — Large caseyids (18–20 mm long) with yellow middorsal stripe; mandibular stipes with broadly rounded ventral lamina; 2nd pleurotergite with marginal concavity anteriorly; gonapophyses long, extending caudoventrad between coxae of 3rd legs; anterior gonopod colpocoxite divided basally into two or usually three fused projections, anterior and posterior with finely divided, spiculate apices, mesal projection long, tapered, apically falcate and glabrous; flagellocoxite absent; telopodite relatively large, long and broad; cyphopod valves fused distad forming flattened ovoid area, lateral valve with large caudolateral process; postgenital plate present.

*Color.* — Head and antennae dark brown; dorsum reticulated brown with broad yellow middorsal stripe; epiproct brown; venter light.

*Description.* — Head with epicranial suture distinct, ending between ocellaria; latter with 22–25 ocelli arranged in triangular patches of five rows; antennae moderately long, ultimate antennomere short and truncate, preceding two articles clavate. Mandibular stipes extending ventrad into broadly rounded lamina (Fig. 18).

Collum narrower than head, longer than segment 2, anterior margin curved. Pleurotergite 2 with three or four striae per side and with anterior, ovoid submarginal impression (Fig. 19). Midbody segments with prominent ventrolateral striae extending to level of first setae, striae becoming indistinct on caudal segments; surfaces rugulose. Dorsal setae sparse, scattered, and short.

Pregonopodal legs of males: Legs 1 and 2 incrassate, with six podomeres, shorter than succeeding legs; tarsi of 1st legs with longitudinal row of stiff mesal setae (Fig. 12). Gonapophysis slender, longer than 2nd legs, extending ventrocaudad between coxae of 3rd legs (Fig. 13). Leg 3 coxa large, spatulate, extending ventrad beyond telopodite articulation (Fig. 14). Legs 4–7 with coxae normal or swollen slightly ventrad.

Anterior gonopod sternum articulating with coxa and telopodite by means of short, pyramidal projection (p, Fig. 2). Colpocoxite divided, usually basally, into variable anterior, posterior, and mesal processes, first two redivided apically into numerous short, spiculate projections, mesal process longer than others, apically glabrous and falcate. Telopodite smooth, broadly rounded, poorly sclerotized, size variable but relatively large for family, shorter than colopocoxite.

Posterior gonopod sternum narrow, extending beyond lateral margins of coxae into short projections. Coxa broad, endite long and narrow, shorter than length of telopodite. Latter articulating laterad with coxa, with long lateral sulcus, mesal surface with small concavities near anterior and posterior margins. Leg 10 coxa with large ventral eversible vesicle, lateral surface narrowing sharply distad, mesal surface with small cylindrical process; telopodite about  $\frac{2}{3}$  as long as that of 11th leg.

Females without mandibular laminae and concavities on 2nd pleurotergites. Tarsi of legs 1 and 2 with rows of moderately stiff setae on mesal surface (Fig. 8). 4th sternum with short, triangular mesal projection; 3rd legs with slight lobe on outer margin of prefemur (Fig. 9). Cyphopod valves with anterior surfaces distinct, fused distad; receptacle with long lateral arm; postgenital plate present (Fig. 6).

*Distribution* (Fig. 222).—South of Vancouver, British Columbia, to northwestern Oregon south of Salem, with an allopatric cave population in southeastern Oregon (Harney County).

*Species*.—One.

*Remarks*.—The coxa, telopodite, and sternum of the anterior gonopods join as shown in Figure 2. A pyramidal sternal projection articulates with a sclerite on the telopodite and two of the three colpocoxite processes, the medial and posterior, which originate basally. The anterior process, which is more laminate, arises anywhere from the base to near midlength.

***Vasingtona irritans* (Chamberlin), NEW COMBINATION**  
(Figs. 2–19)

*Caseya irritans* Chamberlin, 1910:241–242, pl. 34, figs. 6–9, pl. 35, fig. 1; Chamberlin and Hoffman, 1958:87.

*Caseya fasciata* Chamberlin, 1941a:22–23. NEW SYNONYMY.

*Vasingtona fasciata*: Chamberlin and Hoffman, 1958:89; Kevan, 1983:2968.

*Type specimen*.—Juvenile female holotype (NMNH) taken by unknown collector in August 1902 at Portland, Multnomah Co., OR.

*Diagnosis.* — With the characters of the genus.

*Description of males.* — Ocellaria generally with 23 ocelli, arranged in 5 rows as follows: 8, 6, 5, 3, 1 (Fig. 18); relative proportions of antennomeres 0.4, 1.5, 3.0, 2.2, 2.0, 1.2, and 0.6. Collum length/width (l/w) ratio 75%. Body length 18–22 mm.

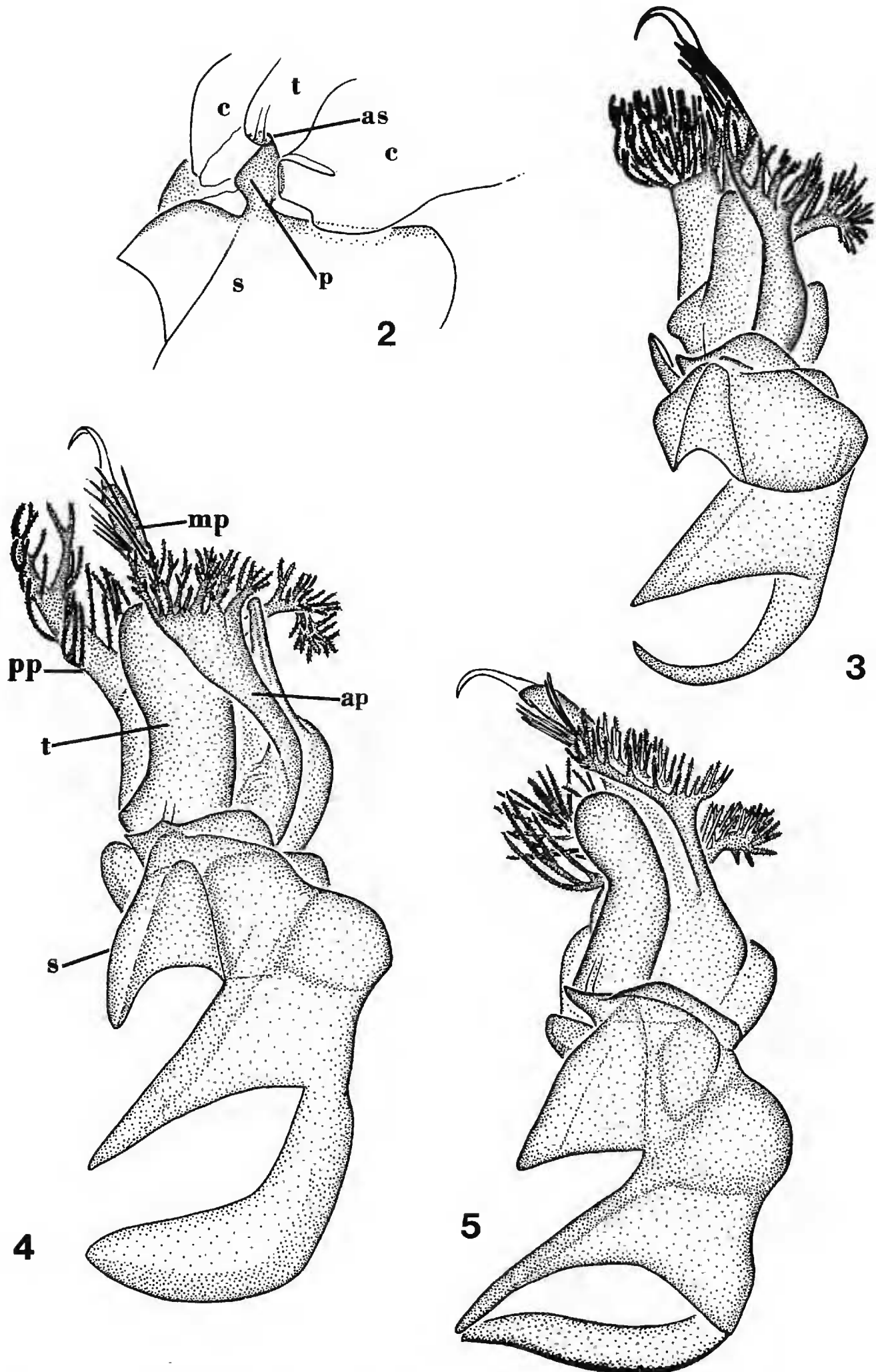
Tarsi of 1st legs with mesal row of stiff setae extending nearly entire length of podomere (Fig. 12). Gonapophysis directed caudad, curving slightly ventrad near midlength and extending to apices of coxal processes of 3rd legs, apically rounded and bent cephalad (Fig. 13). Leg 3 coxa large, spatulate, apex rounded and curving slightly cephalad; telopodite arising near midlength, directed laterad, podomeres slightly shorter than in succeeding legs (Fig. 14). Leg 7 coxa normal, telopodite articulating subapically (Fig. 15).

Anterior gonopod (Figs. 3–5, 10, 11) colpocoxite divided as follows: anterior process arising from base to near midlength, extending slightly caudad, expanding or narrowing distad, often shielding distal extremity of telopodite with a variable number of short, simple or divided, spiculate projections arising apically; posterior process present or absent, size variable, arising basally, directed ventrad or curving slightly caudad, occasionally divided distad, with 15–30 short, variable, spiculate projections arising apically and/or from distal, lateral, and mesal surfaces beginning near midlength, some projections further divided or apically bifurcate; mesal process longest, protruding conspicuously ventrad centrally, tapering smoothly and continuously distad and curving or leaning caudad, with filamentous setae distad, apically glabrous and falcate with long, thin setae on anterior and lateral sides, with or without sclerotized, subspiniiform anterior projection. Flagellocoxite absent. Telopodite relatively long and broad, of subequal width throughout, soft and poorly sclerotized, straight or curving slightly caudad, distal extremity obscured in some males by anterior process, sides and apex smooth, latter broadly rounded.

Posterior gonopod (Figs. 16, 17) sterna extending to lateral margins of coxae, projecting caudolaterad into short, subconical sternal process. Coxal endite long and narrow, nearly  $\frac{2}{3}$  as long as telopodite, tapering gradually to bifurcate tip. Telopodite narrow basally, expanding broadly near  $\frac{1}{4}$  length, becoming globose, with lateral sulcus near midlength containing numerous fine vertical striae.

*Description of female.* — Cyphopod (Figs. 6, 7) valves unequal, margins fused distad into elevated ovoid platform, lateral valve larger, extending into broad, ventrally directed process, distal margin irregular. Receptacle located at bases of valves, with long lateral arm extending nearly to level of platform. Postgenital plate laminate, covering cyphopods caudally.

*Variation.* — The preceding composite description of males throughout the range encompasses most aspects of variation. However, the different forms of the posterior process of the anterior gonopods deserve emphasis. These structures are absent from some males in Yamhill and Clackamas counties, Oregon (Fig. 5), where the long spiculate flagella protruding beyond the telopodite arise from the colpocoxite stem instead of from a separate branch. In males from Multnomah and Clatsop counties, the posterior process is truncate, and the spiculate flagella arise apically (Fig. 3); in one from Lewis County, Washington (Fig. 4), the structure is long, tapers caudad, and the flagella arising distally, laterally, and medially. The left posterior process of this individual has an exceptionally broad, forked



Abbreviations used in figures: aa, apical arm; ac, accessory process; ad, anterior division; ap, anterior process; as, articulating sclerite; c, coxa; cc, colpocoxite; cd, central division; ce, coxal endite; cp, caudal process; cs, basal colpocoxite spine; cx, coxal plate; dlf, distolateral flange; f, flagella; fa, flattened areas; fc, flagellocoxite; fg, flagellar guides; igs, intergonopodal sclerite; lf, lateral flagellum; ll, lateral lamina; lv, lateral valve; mf, mesal flagellum; ml, mesal lamina; mp, mesal process; mv, mesal valve;

projection near midlength, which does not occur on the right gonopod or in other males. This individual also exhibits an elongate, glabrous anterior projection, which is absent from other males. Although more than 200 mi from the nearest collection and found in a cave in the desert, the male from Harney County closely resembles that from Portland illustrated in Figure 3.

*Ecology.*—Material from Clackamas and Clatsop counties, Oregon, and Mason County, Washington, was retrieved from birch, red alder, and conifer litter. That taken from Lewis County, Washington, was found in thick moist duff in a mixed deciduous/conifer stand.

*Distribution.*—*Vasingtona irritans* has the largest distribution of any western caseyid species, and it is the only one spanning the Columbia River. With the allopatric cave population in southeastern Oregon, *V. irritans* is also the only known Pacific caseyid occurring east of the Sierra Nevada and Cascade Mountain ranges. This population reflects a widespread earlier distribution which has disappeared from epigeal environments east of the mountains as the interior basins became more arid. Additional cave populations may occur in southeastern Oregon and adjacent parts of Idaho and Nevada. Excluding this cave population, the north-south dimension of *V. irritans* is nearly 300 mi. In addition to the type, the following specimens were examined:

CANADA. BRITISH COLUMBIA: North Surrey, M, 6 Sep 1965, J. and W. Ivie (AMNH).

USA. WASHINGTON: *Snohomish Co.*, Arlington, 2 M, 11 Sep 1935, R. V. Chamberlin and W. Ivie (NMNH). *Lewis Co.*, Mossyrock, nr. Mossyrock Dam, 2 M, 2 F, 10 Sep 1970 (UCD). *Mason Co.*, 2.5 mi N Grant, M, 21 Jan 1960, EMB (WAS). *Gray's Harbor Co.*, Pacific Beach, M, 2 F, 14 May 1933, R. V. Chamberlin (FSCA).

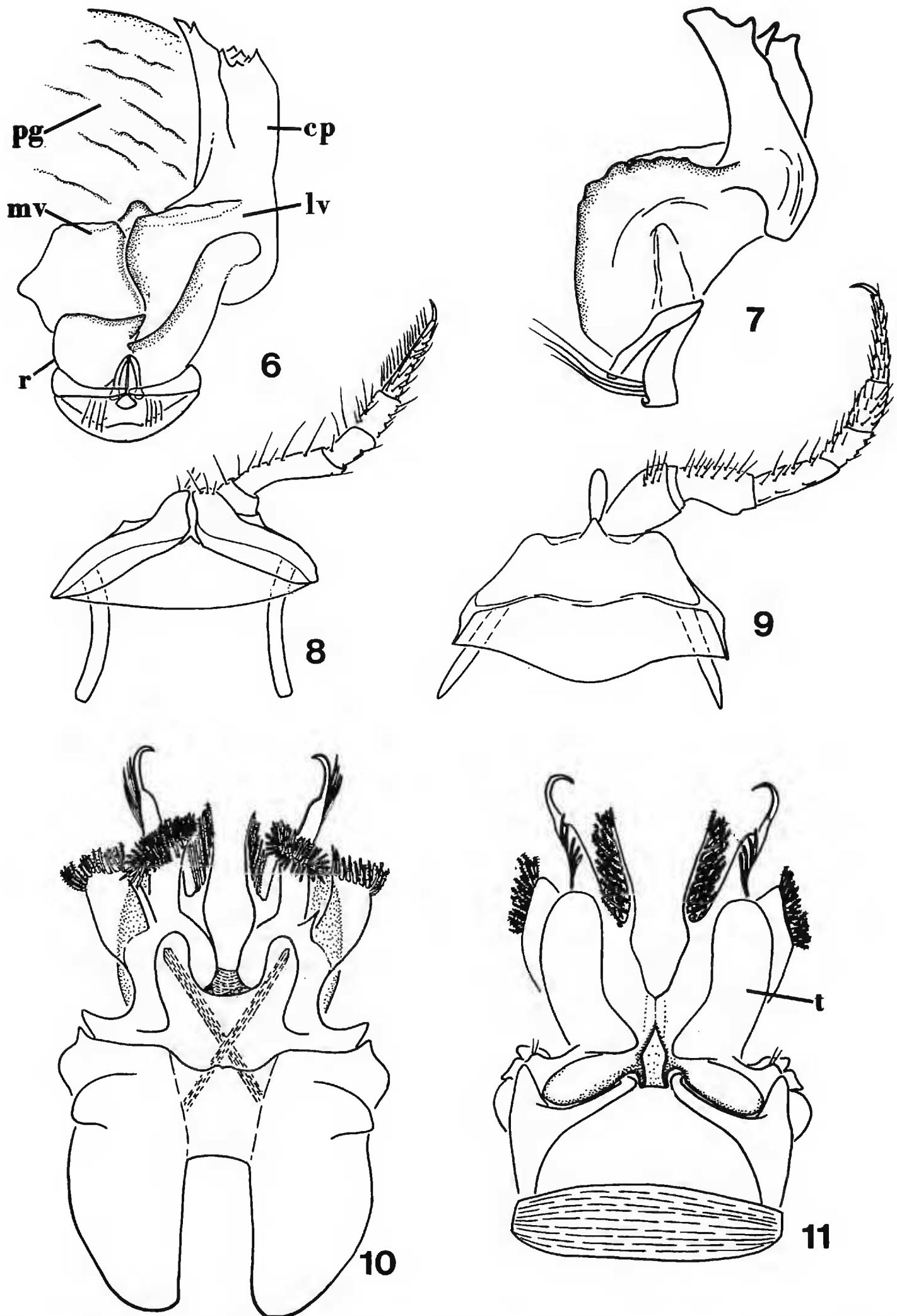
OREGON: *Clatsop Co.*, 5 mi SE Olney, M, 27 Nov 1971, EMB (WAS). *Washington Co.*, 1.7 mi SW Timber, M, 7 Nov 1971, EMB (WAS). *Yamhill Co.*, 5 mi E Yamhill along OR hwy. 240, 2 M, 2 Oct 1971, EMB (WAS); 2 mi S Carlton, M, 1 Jan 1972, EMB (WAS). *Multnomah Co.*, Portland, M, 2 F, 10 May 1957, R. Emmis (FSCA), M, date and collector unknown (NMNH), F, 19 Jun 1982, S. Henshaw (MCZ); Macleay Park, M, 2 Jan 1970 (UCD); Lewis and Clark College, M, Mar 1961, R. Anderson (FSCA) TYPE LOCALITY. *Clackamas Co.*, 1.9 mi W Carver, 2 M, 5 F, 9 Oct 1971, EMB (WAS). *Polk Co.*, Sarah Hemlick St. Pk., 2 M, 3 F, 12 Nov 1966, J. F. Cornell (NCSM). *Lane Co.*, 11 mi NE Blue River, Andrews Exp. For., 4 M, F, 18 Oct–9 Nov 1982, 18 Apr–10 May 1984, G. L. Parsons (RLH, NCSM). *Harney Co.*, Malheur (sic) Cave, 13 mi SE Princeton, M, 10 Sep 1971, EMB (WAS).

*Remarks.*—A key diagnostic feature of *Vasingtona* and *V. irritans* is the absence

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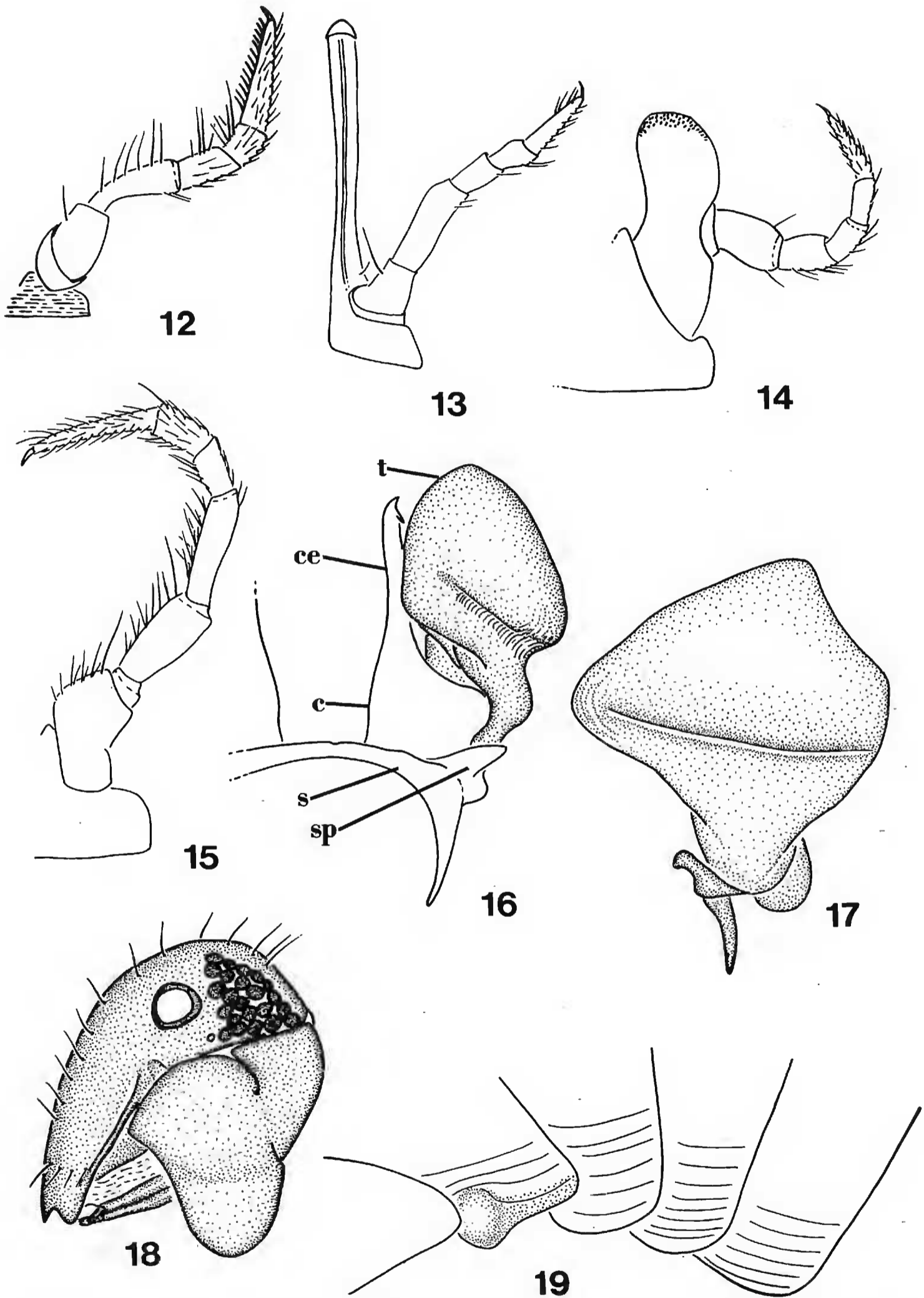
o, oviduct pore; p, pyramidal projection; pd, posterior division; pg, postgenital plate; pp, posterior process; pr, spiculate projections; r, receptacle; rl, lateral ramus; rm, mesal ramus; s, sternum; si, intermediate septum; sp, sternal process; t, telopodite; vl, ventral lamina; vs, caudoventral style.

Figures 2–5. *Vasingtona irritans*. 2. Details of coxosternal articulation, specimen from Lewis Co., WA. 3–5. Anterior gonopods, lateral aspects. 3. Specimen from Multnomah Co., OR. 4. Specimen from Lewis Co., WA. 5. Specimen from Yamhill Co., OR.



Figures 6–11. *Vasingtona irritans*. 6, 7. Right cyphopods. 6. Specimen from Lewis Co., WA, anterior aspect. 7. Specimen from Clackamas Co., OR, lateral aspect. 8, 9. Legs of female from Lewis Co., WA. 8. Leg 2, posterior aspect. 9. Leg 3, anterior aspect. 10, 11. Anterior gonopods of male from Lewis Co., WA. 10. Anterior aspect. 11. Posterior aspect.





Figures 12-19. *Vasingtona irritans*. 12-15. Legs of male from Lewis Co., WA. 12. Leg 1, posterior aspect. 13. Leg 2, anterior aspect. 14. Leg 3, posterior aspect. 15. Leg 7, posterior aspect. 16, 17. Right posterior gonopod of male from Lewis Co., WA. 16. Anterior aspect. 17. Lateral aspect. 18. Head of male from Lewis Co., WA, lateral aspect. 19. Pleurotergites 1-5 of the same, lateral aspect.

of the flagellocoxite found in *Ochrogramma*, *Opiona*, and *Caseya*. However in some males, the lateral process of the colpocoxite arises basally (Figs. 3, 4) in the same relative position.

As the type specimen is an immature female, some doubt exists as to the correct name for the species of *Vasingtona*. However, the identity of *V. fasciata* is certain, and this form is the only caseyid known from Portland, the type locality of *irritans*. We therefore exercise the right of first reviser and designate *irritans* as the senior name for this species.

### *Ochrogramma*, NEW GENUS

*Type species.* — *Ochrogramma formosula*, new species.

*Diagnosis.* — Moderately-large caseyids (11–15 mm) with yellow middorsal stripe; mandibular stipes with narrowly rounded ventral lamina; 2nd pleurotergite without marginal concavity; gonapophyses long, extending caudoventrad between coxae of 3rd legs; anterior gonopod sternum without lateral process; colpocoxite narrow tapering distad; flagellocoxite divided basally into two or five narrow, partly spiculate, simple or redivided flagella; telopodite petiolate; cyphopod valves usually with ventral projections; postgenital plate absent.

*Color.* — Head dark brown dorsad, lighter ventrad; antennae dark brown. Dorsum dark brown with broad yellow middorsal stripe, depigmented ventrad, epi-proct usually yellow, occasionally brown.

*Description.* — Head with epicranial suture distinct, ending between ocelli; with 19–23 ocelli arranged in four or five rows; labrum ventrally elongate; mandibular stipes extending ventrally into narrowly rounded lamina (Fig. 44).

Collum relatively long, anterior margin curving sharply, l/w ratio 75–83%. Pleurotergites of segments 2–4 usually bent sharply mesad near ventral margin, with raised longitudinal ridges along folds. Striae of midbody segments moderate, extending to level of first seta. Surfaces of segments finely rugulose. Dorsal setae small, slender. Body length 11–15 mm.

Pregonopodal legs of males: Legs 1 and 2 with six segments, slightly smaller than succeeding legs; tarsus of 1st leg with mesal longitudinal row of stiff, erect setae (Fig. 45). Gonapophysis long, length subequal to that of 2nd telopodite, curving caudad between 3rd coxae, apically rounded, bent anteriorly (Fig. 46). Leg 3 coxa large, expanding beyond telopodite socket into broad spatulate lobe, telopodite relatively short, podomeres robust (Fig. 47). Legs 4–6 with coxae slightly swollen. Leg 7 coxa extending slightly beyond telopodite socket (Fig. 48).

Anterior gonopod sternum weakly sclerotized anteriorly but well sclerotized laterally, without anterior pouch, articulating caudad with round, flattened intergonopodal sclerite (igs, Fig. 33); sternal process absent. Colpocoxite relatively narrow, curving, bending, or leaning caudad, tapering distad to varying degrees, usually expanding and sinuate apically, stem with or without apical spicules and anterior, mesal, and lateral projections. Flagellocoxite divided basally into two or five simple or redivided, narrow, partly spiculate flagella. Telopodite relatively short, petiolate, broadly rounded to ovoid, ventral margin often flattened.

Posterior gonopod sternum extending beyond lateral margins of coxa into short projection, with small mesal protuberance. Coxa large, endite usually developed into two to four short variable projections. Telopodite ovoid to angular, with long straight lateral sulcus, without raised marginal rim. Leg 10 coxa large basally,

tapering distad, apically slender, with two or three small projections; eversible vesicle large, occupying  $\frac{1}{2}$ – $\frac{3}{4}$  of anteroventral surface; telopodite  $\frac{2}{3}$ – $\frac{3}{4}$  as long as 11th legs.

Cyphopod valves equal or unequal, mesal larger, usually extending ventrad into irregular process. Receptacle relatively small, located on dorsal corners of valves. Postgenital plate absent.

*Distribution.*—The Coast Mountain Range from Tillamook County, Oregon, to Del Norte County, California.

*Species.*—Four.

*Remarks.*—The sternal apparatus of *Ochrogramma* consists of a sclerotized plate which joins laterally with the large, rounded intergonopodal sclerite (igs, Fig. 33). The sternum articulates with the coxa by means of a pyramidal process as in *Vasingtona*, but there is no articulating sclerite. The colpocoxite may possess spiculate projections on the anterior face (pr, Fig. 34), and two to five simple or redivided flagella (f, Fig. 33) comprise the flagellocoxite. The telopodite, weakly sclerotized as in *Vasingtona*, is distinctly petiolate.

In females the cyphopod valves (lv, mv, Fig. 38) extend ventrad into distinct processes, and there is a depression between the valves. There is no postgenital plate. On segment 2 the median sternal process (mp, Fig. 37) does not project between the coxae. There is also a paired anterior flattened area (fa), and the pleuroterga extend laterad into a pair of acute, triangular ventral laminae (vl).

#### KEY TO SPECIES OF *OCHROGRAMMA*

(based on adult males)

1. Flagellocoxite with two flagella; colpocoxite not expanding distad . . . . . 2  
Flagellocoxite with five flagella; colpocoxite expanding distad . . . . . 3
2. Colpocoxite curving smoothly caudad, tapering distad, without anterior spicules (Fig. 24); Tillamook Co., OR . . . . . *heterogona*, new species  
Colpocoxite bent abruptly caudad distally, anterior surface with spicules (Figs. 22, 23); Washington to Coos cos., OR . . . . . *bentona* (Chamberlin)
3. Colpocoxite with mesal process, lateral spur, and numerous anterior spicules (Fig. 21); Curry Co., OR, to Del Norte Co., CA . . . *haigi*, new species  
Colpocoxite smooth, without projections or spicules (Fig. 20); Multnomah to Lane cos., OR . . . . . *formosula*, new species

#### *Ochrogramma heterogona*, NEW SPECIES

(Figs. 24, 32)

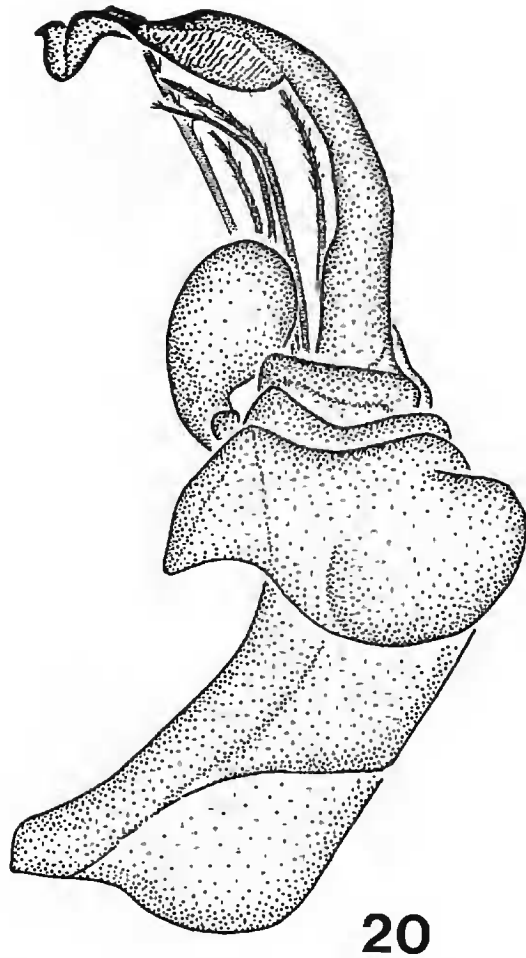
*Type specimens.*—Male holotype (AMNH) and two juvenile female paratypes (WAS) collected by E. M. Benedict, 9 April 1967, at Cape Lookout State Park, Tillamook Co., OR. Two male paratypes (WAS) taken by same collector, 15 March 1972, 7 mi E Baline, Tillamook Co., OR.

*Diagnosis.*—Colpocoxite tapering and curving smoothly caudad, without flanges or projections; flagellocoxite divided basally into two redivided branches.

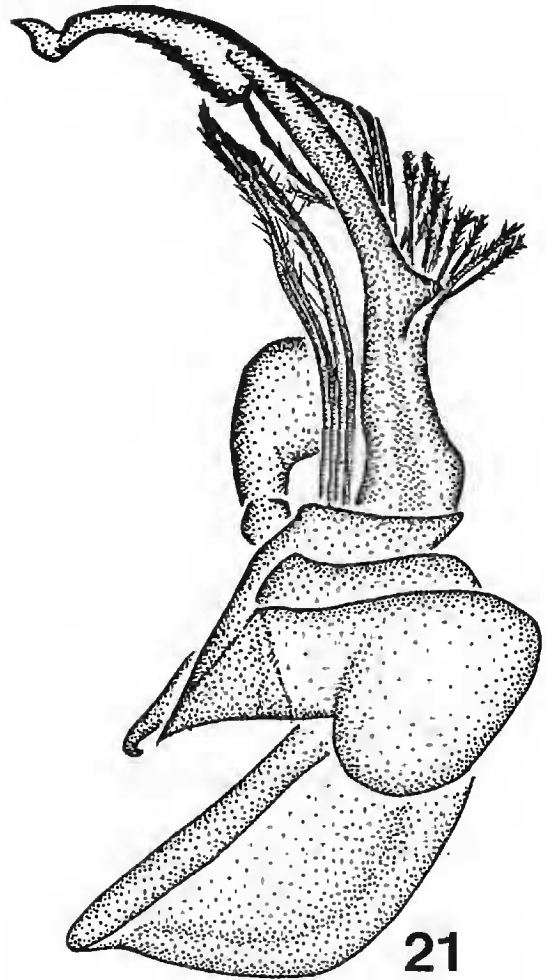
*Holotype.*—Ocellaria with rows of 7, 6, 4, and 2 ocelli, respectively; relative proportion of antennomeres 0.3, 1.1, 2.0, 1.5, 1.5, 1.0, and 0.4; mandibular stipes with well-developed ventral lamina.

Collum l/w ratio 80%. Body length 11 mm.

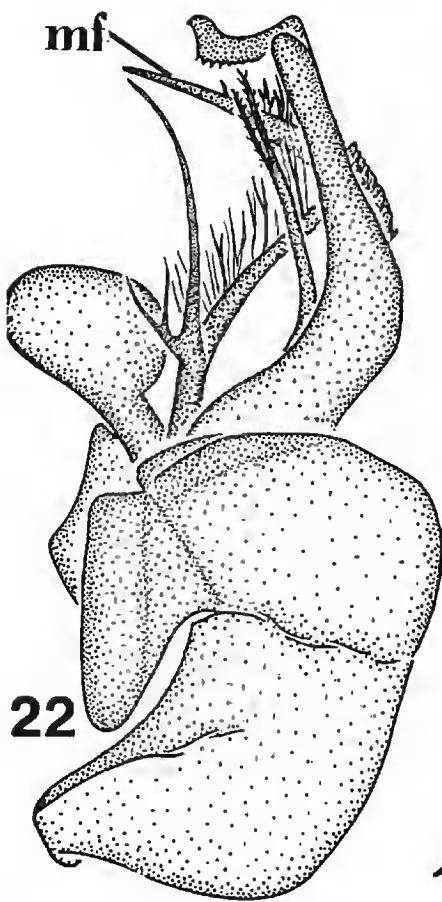
Leg 7 coxa with small apical swelling.



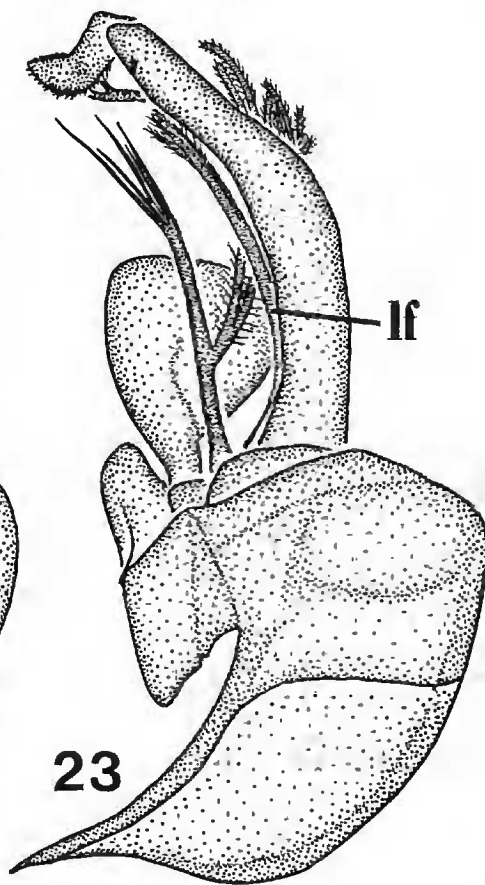
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**formosula**

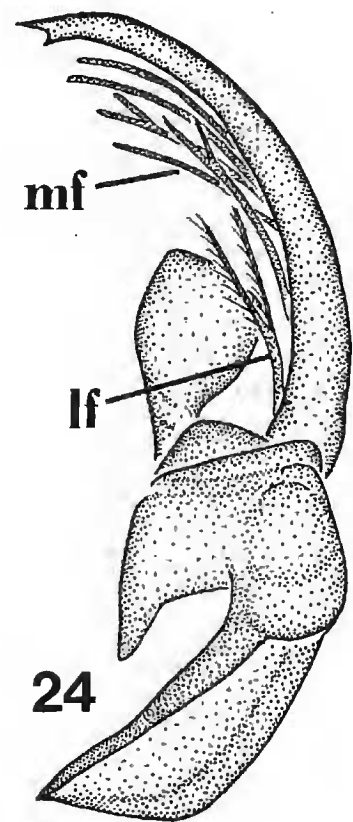
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**haigi**

22

**bentona**

23



24

**heterogona**

Figures 20–24. Left anterior gonopods of *Ochrogramma* spp., lateral aspect. 20. *O. formosula* paratype, Linn Co., OR. 21. *O. haigi* holotype. 22. *O. bentona*, Lincoln Co., OR. 23. *O. bentona*, topotype. 24. *O. heterogona* holotype.

Anterior gonopod (Fig. 24) colpocoxite curving smoothly and continuously caudad, tapering gradually to bifurcate tip, without flanges. Flagellocoxite divided into two flagella, lateral one (lf) short, subdivided into two subequal branches, mesal one (mf) redivided into five branches, two apically bifurcate. Telopodite moderately expanded, apically flattened.

Posterior gonopod coxal endite (Fig. 32) divided into mesal and lateral branches, latter longer, clavate, curving toward distal margin of telopodite, former broad, laminate, caudal corner produced and rounded. Telopodite moderately large, subtriangular. Leg 10 coxa with thin, elongate mesocaudal process.

*Distribution.*—Known only from type and paratype localities.

*Remarks.*—The specimens were collected in red cedar, spruce, huckleberry, and salmonberry litter.

***Ochrogramma bentona* (Chamberlin), NEW COMBINATION**

(Figs. 22, 23, 25–27, 33, 34, 37–44)

*Caseya bentona* Chamberlin, 1952:2, figs. 3–6; Chamberlin and Hoffman, 1958: 87.

*Type specimen.*—Male holotype (NMNH) collected by V. Roth, 6 June 1951, on Mary's Peak, Benton Co., OR. Three female paratypes (NMNH) taken by some collector, 11 Oct 1950, from McDonald Forest, Benton Co. On the label in the vial is the statement, "see mounts," and since both pairs of gonopods are missing, we presume they were mounted on slides, which are lost.

*Diagnosis.*—Colpocoxite bent abruptly caudad distally, anterior surface with numerous short spiculate projections; flagellocoxite divided basally into two flagella, lateral one not redivided.

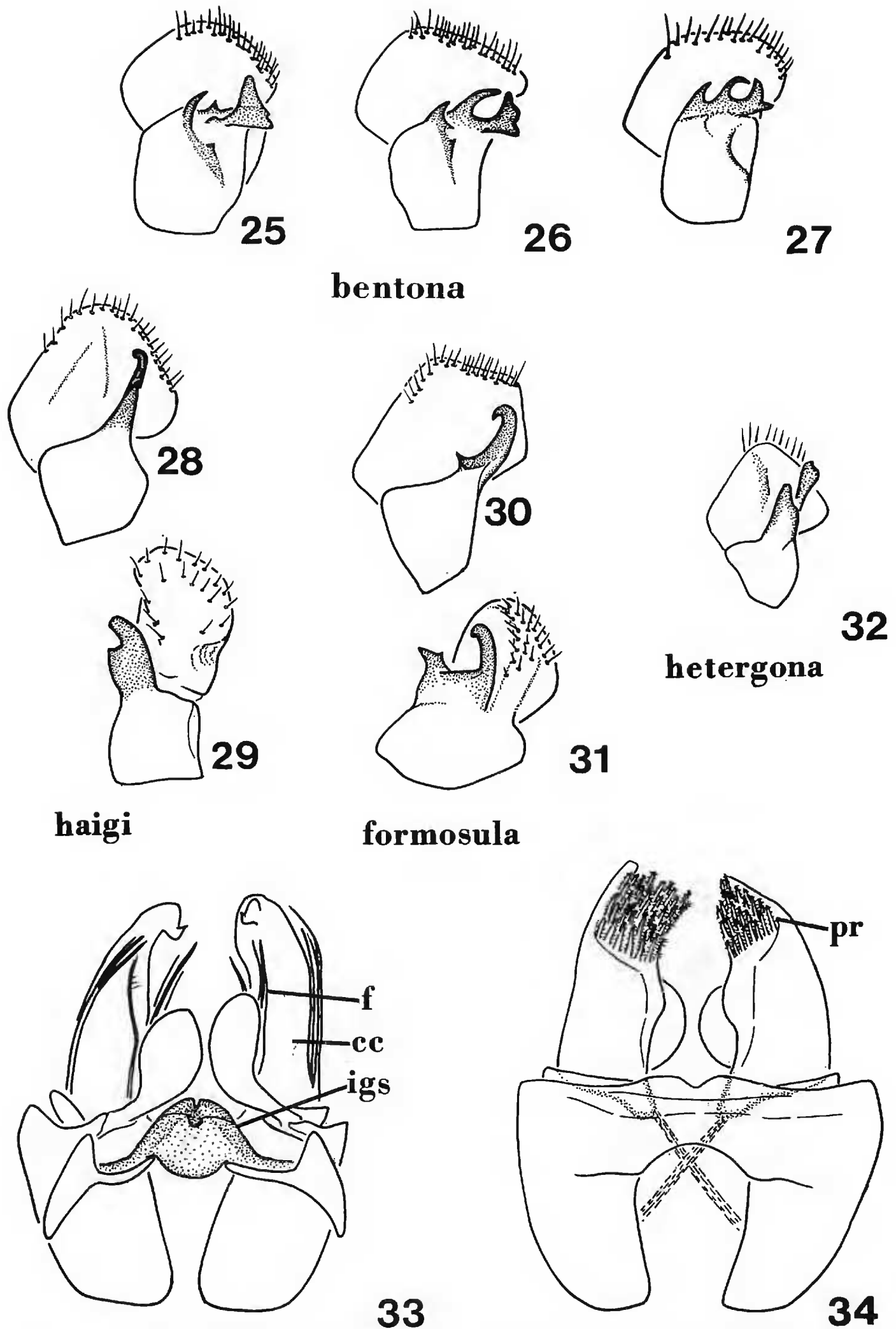
*Description of male.*—Ocellaria with rows of 7, 6, 5, 3, and 1 ocelli, respectively; relative proportions of antennomeres 0.3, 1.1, 1.9, 1.4, 1.6, 1.0, and 0.6; mandibular stipes with typical narrowly rounded ventral lamina (Fig. 44).

Collum l/w ratio 83%. Pleurotergites 2–4 not folded ventrally. Body length 15 mm.

Legs 4–6 with small rounded coxal swellings. Leg 7 with coxa enlarged, swollen mesad.

Anterior gonopod (Figs. 22, 23, 33, 34) colpocoxite curving smoothly caudad then bending abruptly (90°) caudad distally, anterior surface with numerous short spiculate projections distal to midlength, apically blunt, inner margin spiculate. Flagellocoxite divided basally into lateral and mesal flagella, former (lf) not subdivided, closely appressed to, and curving parallel to inner surface of colpocoxite, apically spiculate, mesal flagellum (mf) divided proximal to midlength, caudal branch redivided or apically filiform, anterior branch with short, simple or bifurcate, filiform flagella or redivided basally into two spiculate subbranches, latter further split into 7–9 densely spiculate terminations. Telopodite moderate to large, apically flattened or rounded.

Posterior gonopod coxal endite (Figs. 25–27, 42, 43) with one to four variable projections, much shorter than telopodite, mesal ones shorter than laterals, latter usually divided into two to four subequal processes, at least one projection falcate, curling cephalad. Telopodite relatively large, subtriangular. Leg 10 coxa with narrow lateral ledge, globose anterior projection, small cylindrical ventrocaudal and short, rounded mesal processes.



Figures 25–34. *Ochrogramma* spp. males. 25–32. Left posterior gonopods. 25–27. *O. bentona*, mesal aspect. 25. Specimen from Benton Co., OR. 26. Specimen from Lincoln Co., OR. 27. Specimen from Washington Co., OR. 28, 29. *O. haigi* holotype. 28. Mesal aspect. 29. Anterior aspect. 30, 31. *O. formosula* paratype, Linn Co., OR. 30. Mesal aspect. 31. Anterior aspect. 32. *O. heterogona* holotype, mesal aspect. 33, 34. Gonopods of *O. bentona*, Benton Co., OR. 33. Posterior aspect. 34. Anterior aspect.

*Description of female.*—Pleuroterga of segment 3 (Fig. 37) with subtriangular ventrolateral projections (vl); sternum with acuminate mesal process (mp), and broad flattened anterior areas (fa). Cyphopod valves unequal, lateral smaller, broad and rounded to narrow and elongate, mesal valve larger, configuration variable, often irregular and with ventral lobe (Figs. 39–41).

*Distribution.*—Coastal Oregon from Washington to Coos counties. In addition to the types, the following specimens were examined:

OREGON: *Washington Co.*, 1 mi N Gaston, M, 2 Oct 1971, EMB (WAS); 2 mi N Helvetia on Bishop Rd., M, 21 Jan 1968, D. R. Malcolm (WAS). *Lincoln Co.*, 0.6 mi NW Elk City, M, 4 F, 20 Dec 1971, EMB (WAS); along OR hwy. 34 between Tidewater and Waldport, 3 M, F, 19 Sep 1946, J. C. Chamberlin (FSCA); State Forest Camp E of Waldport, M, 30 Oct 1960, D. R. Malcolm (WAS); 12 mi E Kernville, 7 M, 3 F, 28 Jan 1970 (UCD); 10 mi SE Kernville, F, 17 Feb 1969, R. L. Westcott and E. M. Fisher (UCD); 1.4 mi N Nashville, M, 2 F, 20 Dec 1971, EMB (WAS). *Benton Co.*, McDonald Forest near Corvallis, 3 M, 3 F, 4 Mar 1969, 3 M, 5 F, 13 Nov–18 Dec 1968, R. L. Westcott (UCD); 6 mi N Corvallis, Sulphur Spr., F, 26 Mar 1969, EMB (WAS); 6 mi N Corvallis, Peavy Arboretum, M, 17 Jan 1973, L. Russell (RLH); 0.5–2.3 mi NW Glenbrook, M, 4 F, 4 Dec 1971, EMB (WAS); Sulphur Spgs., M, 3 F, 18 Oct 1962, C. W. Baker (RLH). *Lane Co.*, 11 mi NE Blue River, Andrews Exp. For., 2 M, F, 18 Oct–9 Nov 1982, G. L. Parsons (RLH, NCSM). *Douglas Co.*, 7.7 mi SW Cottage Grove, F, 23 Mar 1968 (UCD); 0.7 mi W Scottsburg, along Umpqua R., M, 11 Dec 1971, EMB (WAS); 4.5 mi E Wells Cr. Ranger Sta., F, 11 Dec 1971, EMB (WAS); 2 mi N Melrose, M, 7 Feb 1972, EMB (WAS); near Cleveland Hill Cemetery, M, 3 F, 7 Feb 1972, EMB (WAS). *Coos Co.*, 8–15 mi E Allegany, M, 13 F, 20–21 Nov 1971, EMB (WAS). *Polk Co.*, 4.7 mi E Valsetz, F, 20 Nov 1968, EMB (WAS).

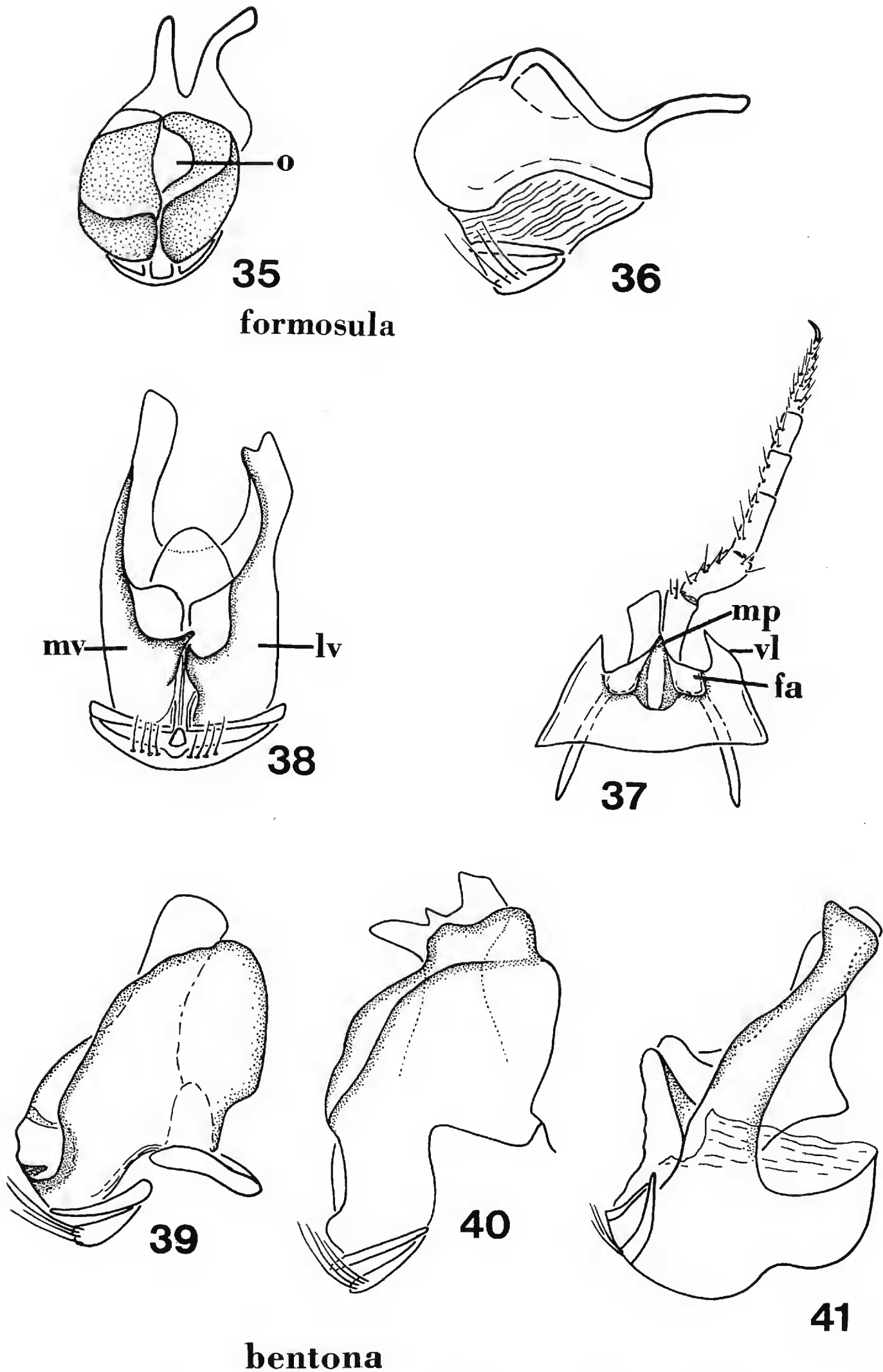
*Remarks.*—Despite the absence of topotypical males to confirm the identity of *O. bentona*, we think that the name refers to this common species in Benton County. Chamberlin (1952) did not mention a mandibular modification in the original description, but the stipes of a nearby Lincoln County male possess ventral laminae (Fig. 44). Moreover, the yellow middorsal stripe, which he did report, is clearly visible after 36 yr in preservative. Although Chamberlin's drawings of the anterior and posterior gonopods (1952: figs. 3–6) amount to rough sketches, they vaguely resemble males we illustrate, particularly in the posterior gonopods. As first revisers, we therefore assign *O. bentona* to this form.

*Ochrogramma bentona* has been taken from mixed conifer-deciduous duff, from litter beneath ash trees, and also from bark, moss, and litter from the riparian zone of a creek.

### *Ochrogramma haigi*, NEW SPECIES (Figs. 21, 28, 29)

*Type specimens.*—Male holotype and one female and three juvenile paratypes (UCD) collected by T. R. Haig, 7 May 1971, along CA highway 199, 5 mi SW Gasquet, Del Norte Co., CA. Paratypes collected by E. M. Benedict, 12 February 1972, from Curry Co., OR (WAS), as follows: M, 5 mi N Brookings; M, F, 4 mi S Pistol River.

*Diagnosis.*—Colpocoxite leaning caudad, expanding distal to midlength then tapering to bisinuate tip, inner margin spiculate, stem with lateral spur, spiniform



Figures 35–41. *Ochrogramma* spp. females. 35, 36. Right cyphopods of *O. formosula* paratype, Linn Co., OR. 35. Anteroventral aspect. 36. Lateral aspect. 37–41. *O. bentona*. 37, 38. Specimen from Lincoln Co., OR. 37. Leg 3, anterior aspect. 38. Right cyphopod, anterior aspect. 39–41. Right cyphopod, lateral aspect. 39. Specimen from Lincoln Co., OR. 40. Specimen from Coos Co., OR. 41. Specimen from Lincoln Co., OR.



mesal process, and nine spiculate projections on anterior surface; flagellocoxite divided basally into five long narrow flagella.

*Holotype*.—Ocellaria with rows of 7, 6, 5, 3, and 1 ocelli, respectively; relative proportions of antennomeres 0.3, 1.3, 2.2, 1.8, 1.7, 1.0 and 0.5; mandibular stipes with well-developed, rounded, ventral lamina.

Collum l/w ratio 77%. Pleurotergites 2–4 with strong marginal carinae, that of segment 3 folded inward. Body length 14 mm.

Leg 7 coxa swollen slightly ventrad beyond telopodite socket; latter normal.

Anterior gonopod colpocoxite (Fig. 21) broad basally, leaning caudad, tapering distal to midlength than expanding and tapering again to bisinuate tip; inner margin distally spiculate; mesal surface with three slender spiniform processes at midlength; anterior surface with nine short, finely spiculate processes at  $\frac{1}{3}$  length; lateral surface with triangular spur at  $\frac{1}{3}$  length. Flagellocoxite divided basally into five long, narrow, distally spiculate flagella directed toward distal part of colpocoxite, about  $\frac{2}{3}$  as long as latter. Telopodite moderate-size, apically flattened.

Coxal endite of posterior gonopod (Figs. 28, 29) a simple, short projection, curving caudad, with short mesal spur. Telopodite profile subtriangular. Leg 10 coxa apically with short, rounded mesal, and long, thin caudal processes.

*Female paratype*.—Cyphopod valves long and narrow, lateral valve slightly longer, curving laterad.

*Distribution*.—Known only from the southwestern corner of Oregon and the northwestern corner of California. In addition to the type and paratype localities, the following sample was examined:

CALIFORNIA: *Del Norte Co.*, 2 mi N Ft. Dick, 3 M, F, 21 Nov 1953, V. Roth (NMNH).

### *Ochrogramma formosula*, NEW SPECIES

(Figs. 20, 30, 31, 35, 36, 45–48)

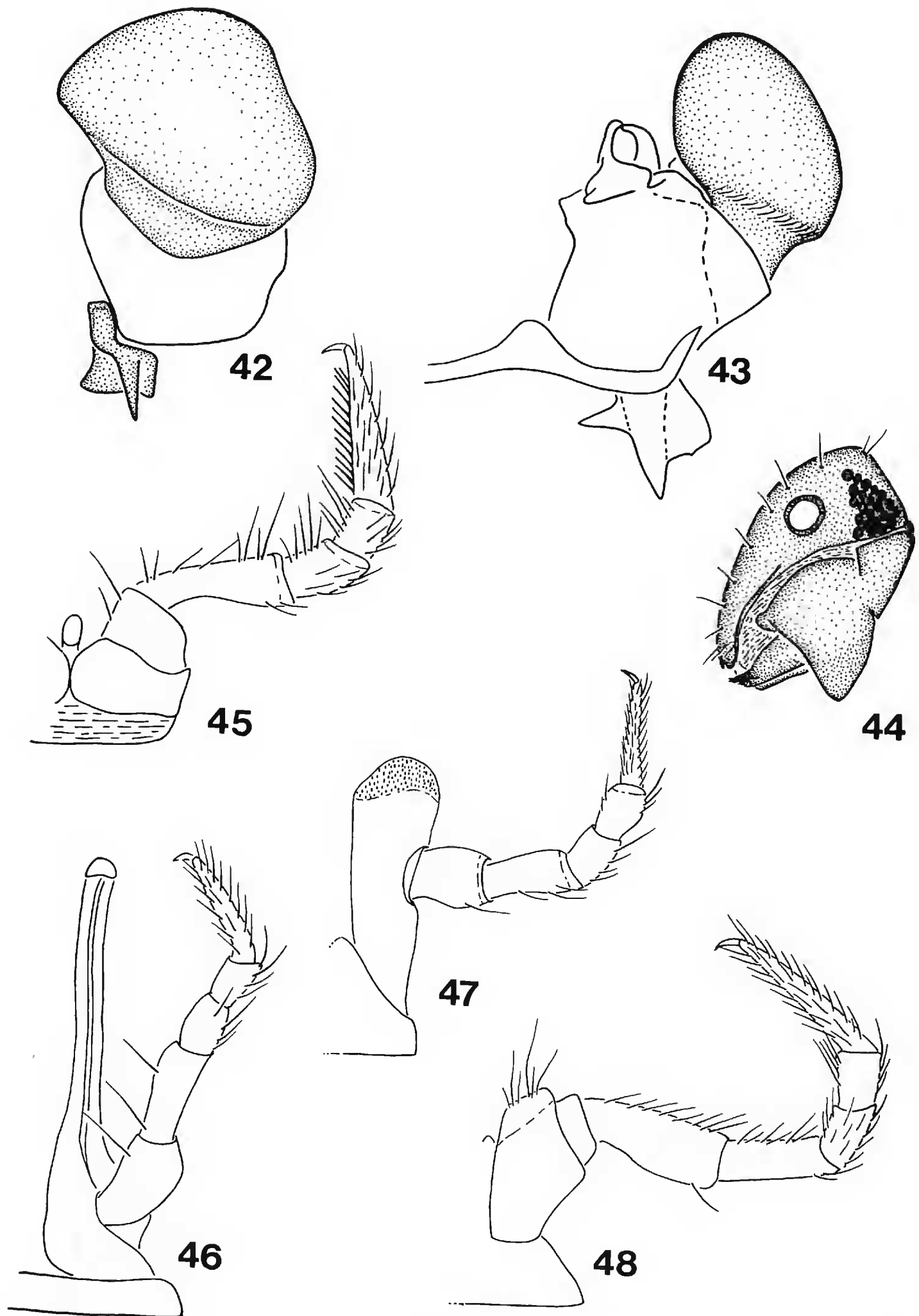
*Type specimens*.—Male holotype and two male and one female paratypes (UCD) collected by R. L. Westcott, 10 March 1969, 2 mi SE Gates, Linn Co., OR. Other paratypes, all from Oregon, as follows: *Lane Co.*, 4 mi N, 10 mi E Lowell, M, 4 Mar 1972, EMB (WAS). *Marion Co.*, 2 mi W Mehama, M, 24 Feb 1970, J. S. Buckett and R. L. Westcott (UCD); 1.5 mi S Mill City, F, 9 Mar 1969, E. M. Fisher (UCD). *Multnomah Co.*, 3 mi E Troutdale, F, 24 Nov 1969, K. Goeden (UCD).

*Diagnosis*.—Colpocoxite curving strongly caudad at midlength, expanding distally into smooth, sinuate flange along inner margin, apically bisinuate, stem without projections; flagellocoxite divided basally into five long, narrow flagella.

*Holotype*.—Ocellaria with rows of 7, 6, 4, and 2 ocelli, respectively; relative proportions of antennomeres 0.3, 1.0, 1.9, 1.3, 1.5, 1.0, and 0.5; mandibular stipes with well-developed ventral lamina.

Collum l/w ratio 75%. Body length 12 mm.

Sternum of segment 2 produced into dactyliform process between coxae. Leg 1 (Fig. 45, not this specimen) relatively long, prefemur longest podomere, tarsus with row of stiff, erect setae mesally. Leg 2 (Fig. 46, not this specimen) podomeres of normal proportions; gonopophysis length subequal to that of telopodite, apically rounded, bent anteriad. Leg 3 (Fig. 47, not this specimen) coxa expanding broadly beyond telopodite articulation, apically rounded; telopodite only slightly longer



Figures 42-48. *Ochrogramma* spp. males. 42, 43. Right posterior gonopod of *O. bentona* from Washington Co., OR. 42. Lateral aspect. 43. Anterior aspect. 44. Head of *O. bentona* from Lincoln Co., OR, lateral aspect. 45-48. Male legs of *O. formosula* paratype, Linn Co., OR. 45. Leg 1, posterior aspect. 46. Leg 2, anterior aspect. 47. Leg 3, posterior aspect. 48. Leg 7, posterior aspect.

than coxa. Legs 4–6 with coxae slightly swollen. Leg 7 (Fig. 48, not this specimen) coxa expanding slightly ventrally.

Anterior gonopod colpocoxite (Fig. 20) curving strongly caudad at midlength, tapering to  $\frac{2}{3}$  length, then expanding sharply along inner margin into smooth, sinuate flange, stem without spicules or projections. Flagellocoxite divided basally into five long, narrow, distally spiculate flagella, directed toward distal part of colpocoxite, about  $\frac{2}{3}$  as long as latter. Telopodite relatively large, apically rounded, ovoid.

Coxal endite of posterior gonopod (Figs. 30, 31) broad, lateral corner elongate, falcate, mesal corner short, truncate. Telopodite profile angular. Leg 10 coxa with short, rounded mesal, and long, thin mesocaudal processes.

*Female paratype.*—Cyphopod valves subequal, with long, curved lateral, and shorter, straight mesal projections (Figs. 35, 36).

*Distribution.*—Known only from the type and paratype localities on the eastern slope of the Willamette Valley in the Cascade foothills, from the Columbia River to central Lane County.

### Genus *Opiona* Chamberlin

*Opiona* Chamberlin, 1951:8; Causey, 1954:81; 1963:197; Chamberlin and Hoffman, 1958:88; Buckett, 1964:13; Jeekel, 1971:73; Shear, 1972:259; Hoffman, 1979:138; Kevan, 1983:2967.

*Type species.*—*Opiona columbiana* Chamberlin, 1951, by original designation.

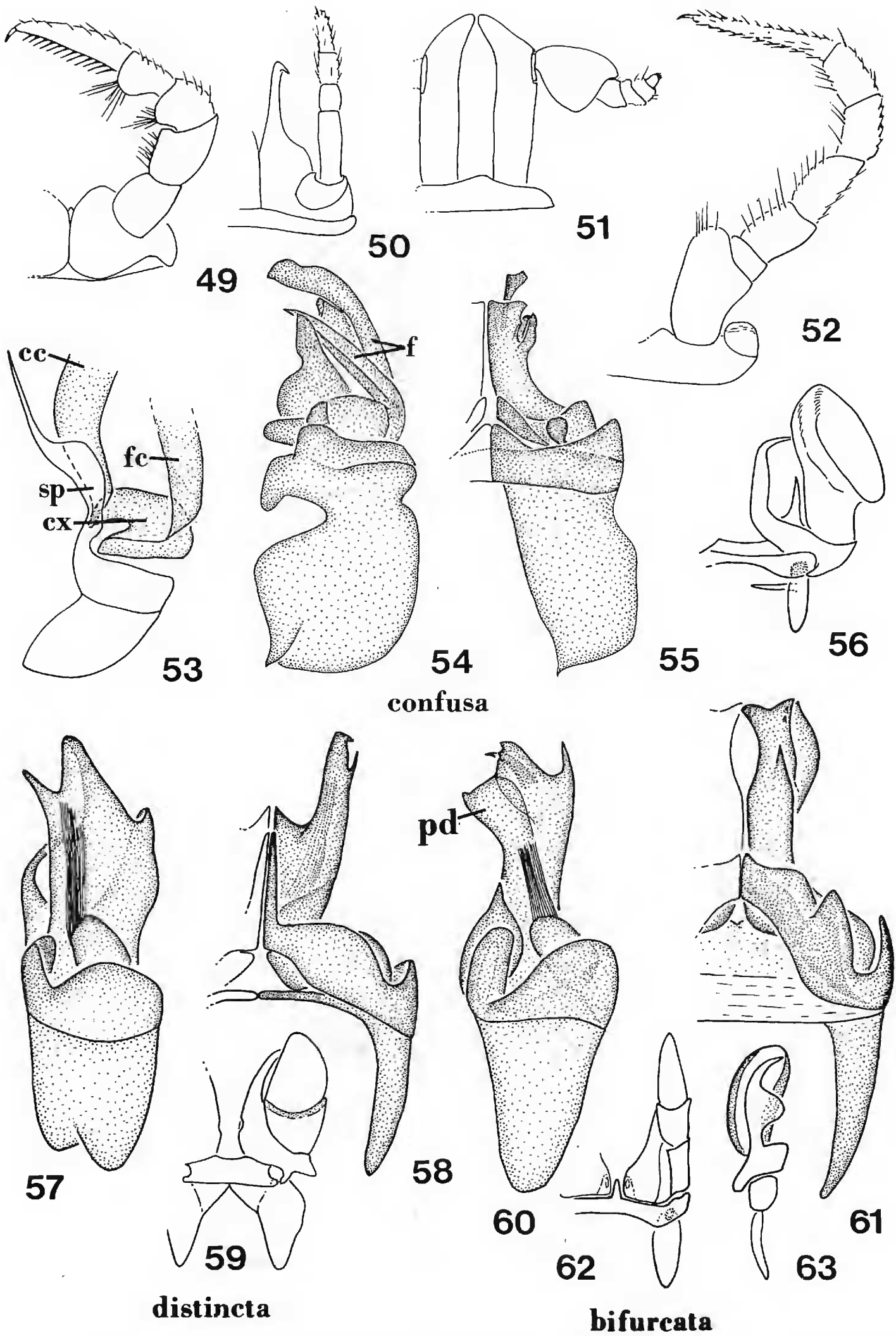
*Diagnosis.*—Small caseyids (8–14 mm) characterized by short 2nd and 3rd legs of males and by following features of anterior gonopods: sternal process and telopodite present, flagellocoxite produced as lobe bearing numerous long, fine flagella or three lanceolate projections.

*Color.*—Head dark brown dorsally, light ventrally, antennae brown. Dorsum brown dorsally, depigmented around setae; venter mottled brown.

*Description.*—Head with epicranial suture distinct, ending between ocellaria; latter with 2–4 rows of from 6 to 16 ocelli; mandibular stipes not modified.

Collum narrower than head, longer than segment two, l/w ratio 50–66%, anterior margin evenly curved, rim raised and continuing to caudal margin. Pleurotergite 2 with ventral margin straight, truncate, indented, or with caudal corner acute; often extending below level of adjacent pleurotergite; 3rd pleurotergite with ventral margin straight, rounded, concave, or with caudal notch; ventral margins of 4th pleurotergites rounded, truncate, or with anterior or caudal corners produced; ventral margins of remaining pleurotergites broadly rounded, surfaces finely rugulose. Dorsal setae variable in length and thickness, slender to spatulate, occasionally larger on caudal segments. Striae variable, faint to well developed, distinct, usually faint on anterior segments, located ventrolaterad on anterior segments, extending to middorsum in midbody region.

Pregonopodal legs of males: Leg 1 six-segmented, often robust or crassate, proximal podomeres occasionally with small lobes, tarsus with longitudinal row of erect mesal setae (Fig. 49). Leg 2 (Fig. 50) also with 6 segments but much smaller,  $\frac{1}{4}$ – $\frac{1}{2}$  as long as 1st leg, recessed in body cavity; tarsal claw rudimentary or absent. Gonopophysis (Fig. 50) variable,  $\frac{1}{2}$  as long to longer than 2nd leg, curving cephalad and tapering to an acute apex. Leg 3 (Fig. 51) coxa elongate,



Figures 49-63. *Opiona* spp. males. 49-52. Legs of *O. casualis* holotype. 49. Leg 1, posterior aspect. 50. Leg 2, anterior aspect. 51. Leg 3, posterior aspect. 52. Leg 7, posterior aspect. 53. *O. facetia*, details of coxosternal articulation. 54-56. *O. confusa* holotype. 54. Left anterior gonopod, lateral aspect. 55. The same, posterior aspect. 56. Right posterior gonopod, anterior aspect. 57-59. *O. distincta* holotype. 60-63. *O. bifurcata* holotype.

dorsoventrally flattened, extending into variable lobe beyond articulation of telopodite; latter short, occasionally shorter than coxa prefemur often expanded and flattened, occasionally longer than remaining podomeres, tarsus usually minute.

Anterior gonopod sternum relatively narrow, extending laterad as variable process, short to long, straight or bent, truncate, clavate, or acicular, with or without apical setae; apodemes broad. Colpocoxite relatively large, usually upright or curving caudad to varying degrees, occasionally curving slightly cephalad, with or without serrate, striate projections from caudal surface usually arising near midlength, simple or variably divided distad, divisions with or without setae. Flagellocoxite with rounded, conical, or triangular basal sclerite, either with three lanceolate projections or numerous flagella arising either apically or from caudal margin. Telopodite usually smaller than coxal sclerites and sternal process, occasionally partly or completely obscured by latter in lateral and caudal views; configuration variable, short or long and narrow, oblong, rounded, bulbous, or petiolate.

Posterior gonopod sternum moderately broad, medially concave, length variable, extending to levels of apodeme, or midlength or lateral margins of coxae, without lateral projections. Coxa moderately large, endite variable, shorter than, subequal to, or longer than length of telopodite, configuration variable, simple or divided into two or three variable projections, with or without basal spur. Telopodite ovoid, rounded, or laterally flattened, with or without submarginal rims, inner surface flat or concave, with or without lobes demarcated by emarginations, sulci, or constrictions. Leg 10 coxa with large anterior eversible vesicle and variable mesal process; telopodite slightly smaller.

Cyphopod valves subequal or unequal, mesal usually larger, usually rounded or irregular, occasionally with caudal lobes. Receptacle usually consisting of basal and angular sclerotized bars on caudal corner of valves. Postgenital plate absent.

*Distribution.*—Known from two allopatric areas, one from southern Oregon to southern British Columbia and Vancouver Island, and the other along the central California coast from Mendocino to Santa Cruz counties.

*Species.*—Thirteen, one divided into three geographic races.

*Remarks.*—In the anterior gonopods of *Opiona*, the sternal process (sp, Fig. 53) is long and extends ventrad beyond the articulation of the sternum and basal coxal plate. The flagellocoxite usually bears numerous filiform flagella which are closely appressed to the colpocoxite, the most prominent structure of the anterior gonopods in all species except *O. confusa* (Figs. 54, 55). Here the colpocoxite is partly obscured by, and appears to function as a support for, the lanceolate projections of the flagellocoxite. The telopodite attaches posteriorly to the coxal plate and is a comparatively small and insignificant part of the gonopod in contrast to its condition in *Caseya*.

The cyphopod valves of *Opiona* (Figs. 103–110) are generally separate, rounded, tend to lack projections, and are usually unequal, with the mesal valve larger.

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57. Left anterior gonopod, lateral aspect. 58. The same, posterior aspect. 59. Right posterior gonopod, anterior aspect. 60–63. *O. bifurcata* holotype. 60. Left anterior gonopod, lateral aspect. 61. The same, posterior aspect. 62. Right posterior gonopod, anterior aspect. 63. Left posterior gonopod, mesal aspect.

The oviduct pore (o, Fig. 104) is situated centrally behind the receptacle at the end of a recessed groove.

The second legs of females (Fig. 100) are similar to those in *Vasingtona*; the 3rd legs are not separated by the median sternal process (mp, Fig. 102). The flattened areas (fa) of the 4th sternum are low, and the inner corners of the laminate ventrolateral projections (vl) are acuminate.

KEY TO SPECIES AND SUBSPECIES OF *OPIONA*  
(based on adult males)

1. Flagellocoxite with three lanceolate projections, longer than colpocoxite (Fig. 54); Lincoln Co., OR ..... *confusa*, new species  
Flagellocoxite with long, hair-like flagella ..... 2
2. Sternal process of anterior gonopod large, robust, prominent from caudal aspect, often partly concealing telopodite; colpocoxite flattened laterally, divided distad, caudal division acute or rounded (Figs. 57, 60, 65, 68, 72, 74) ..... 3  
Sternal process of anterior gonopod slender, inconspicuous, not concealing telopodite; colpocoxite usually curving caudad, upright in one species (Figs. 77, 80, 83, 86, 89, 92, 94) ..... 9
3. Sternal process very long, subequal to length of colpocoxite, distally bifurcate (Figs. 215, 216); Mendocino Co., CA ..... *siliquae* Causey  
Sternal process simple, acuminate or truncate ..... 4
4. Caudal division of colpocoxite broadly laminate or acute, not setose (Figs. 57, 58, 60, 61) ..... 5  
Caudal division of colpocoxite flattened or rounded, setose (Figs. 64, 67, 70, 73) ..... 6
5. Sternal process long, acuminate, curving cephalad between colpocoxites; anterior division of colpocoxite curved mesad (Figs. 57, 58); Sonoma Co., CA ..... *distincta*, new species  
Sternal process short, truncate; anterior division straight (Figs. 60, 61); Mendocino Co., CA ..... *bifurcata*, new species
6. Colpocoxite with caudal division rounded, directed mesad (Figs. 64, 65); Napa Co., CA ..... *berryessae*, new species  
Colpocoxite with caudal division flattened .. *communis*, new species ... 7
7. Sternal process prolonged distally, acuminate; coxal endite of posterior gonopod with distinct subapical tooth (Fig. 75); Napa and Sonoma cos., CA ..... *communis prolixa*, new subspecies  
Sternal process not or only slightly prolonged; coxal endite without distinct subapical tooth ..... 8
8. Colpocoxite central division (cd, Fig. 70) relatively long, overhanging anterior division; posterior division extending moderately mesad (Fig. 71); Santa Cruz to Sonoma and Solano cos., CA .....  
..... *communis communis*, new subspecies  
Colpocoxite central division relatively short, terminating well before level of anterior division; posterior division extending strongly mesad (Figs. 67, 68); Marin and Sonoma cos., CA .....  
..... *communis angusta*, new subspecies

9. Colpocoxite either with striate, serrate caudal projection or caudal margin displaying these features (Figs. 79, 82, 85) ..... 10  
 Caudal margin of colpocoxite smooth, with or without projection (Figs. 76, 88, 92, 93) ..... 12
10. Flagellocoxite very long, length subequal to or slightly longer than that of colpocoxite (Figs. 85, 86); King Co., WA, to vicinities of Vancouver and Victoria, BC ..... *columbiana* Chamberlin  
 Flagellocoxite much shorter than colpocoxite ..... 11
11. Sternal process apically curled, simple, acuminate, not setose (sp, Fig. 82); Sonoma and Mendocino cos., CA ..... *exigua*, new species  
 Sternal process apically clavate, setose (Fig. 79); Polk to Clatsop cos., OR ..... *goedeni*, new species
12. Anterior gonopod telopodite relatively large, inflated, petiolate (Figs. 77, 94) ..... 13  
 Anterior gonopod telopodite relatively small and inconspicuous, not inflated or petiolate (Figs. 89, 91) ..... 14
13. Flagella of flagellocoxite extending parallel to colpocoxite nearly to tip; latter distally divided, upright (Fig. 93); Lincoln and Lane cos., OR ..  
 ..... *fisheri*, new species  
 Flagella much shorter, removed from and terminating well below tip of colpocoxite; latter distally entire, curving strongly caudad (Fig. 76); Polk and Lincoln cos., OR ..... *casualis*, new species
14. Sternal process of anterior gonopod long, acicular, not setose; distal divisions of colpocoxite relatively short, straight (Figs. 88, 89); Marion and Clackamas cos., OR ..... *facetia*, new species  
 Sternal process of anterior gonopod short, clavate, apically setose; distal divisions of colpocoxite long, curving strongly caudad (Fig. 92); Douglas Co., OR ..... *scytonotoides*, new species

***Opiona confusa*, NEW SPECIES**

(Figs. 54–56, 106)

*Type specimens.*—Male holotype and four male and nine female paratypes (UCD) collected by J. S. Buckett and K. Goeden, 28 January 1970, 12 mi SE Kernville, Lincoln Co., OR.

*Diagnosis.*—Characterized by short truncate sternal process curving mesad caudad to colpocoxite and anterior to telopodite; flagellocoxite not flagellate, divided into three lanceolate processes, mesalmost curving over colpocoxite; latter short, partly obscured by flagellocoxite.

*Holotype.*—Ocellaria with rows of 6, 5, 3 and 1 ocelli, respectively; relative proportions of antennomeres 0.3, 1.2, 2.3, 1.5, 1.7, 1.0, 0.5.

Collum l/w ratio of 65%. Pleurotergites 2–3 with margins straight, former extending below latter; pleurotergite 4 with margin rounded. Body length 11 mm.

Leg 1 with all podomeres except tarsus crassate. Leg 2  $\frac{1}{4}$  as long as former, tarsus minute, claw absent; gonapophysis  $\frac{1}{2}$  as long as leg. Leg 3 coxa with rounded distomedial lobe; telopodite short, articulating distal to midlength of coxa, pre-femur flattened, wider than coxa, longer than remaining podomeres.

Anterior gonopod (Figs. 54, 55) sternal process short, truncate, extending mesad

on caudal side of colpocoxite and anterior side of telopodite. Colpocoxite short, broad, divided distally into transverse, mesal and shorter lateral branches. Flagellocoxite (fl, Fig. 54) with large rounded basal sclerite, divided into three long lanceolate projections, mesalmost longest and curving caudad over colpocoxite, lateral projections parallel and closely appressed to each other, extending caudad between branches of colpocoxite. Telopodite small, distally rounded.

Posterior gonopod (Fig. 56) sternum terminating at level of apodeme, slightly indented mesally. Coxal endite divided, mesal branch long, bent laterad distally, tapering to acuminate tip and touching mesal surface of telopodite, lateral process shorter, spiniform. Telopodite with submarginal rims, outer lobe demarcated by deep emargination. Leg 10 coxa with low, rounded lateral lobe, and large, mesal process.

*Female paratype.*—Cyphopod with mesal valve rounded, much larger than lateral valve (Fig. 106).

*Distribution.*—Known only from the type locality.

*Opiona siliquae* Causey  
(Figs. 215–218)

*Opiona siliquae* Causey, 1963:197–198, figs. 5–8; Buckett, 1964:13.

*Type specimens.*—Male holotype and 1 female paratype (NMNH) and 3 male, 3 female, and 2 juvenile paratypes (CAS) taken by R. E. Graham, 2 January 1960, in Fault Rock Cave, Mendocino Co., CA. This site is near Spy Rock in section 32, T24N, R14W (T. Briggs, pers. comm.). Causey (1963) designates the CAS as the repository for the holotype, but she sent this specimen and a female paratype to the NMNH after writing and possibly even after publishing the description, as shown by their accession records. Thus, it appears that the NMNH was the intended repository for the holotype and that her printed statement is wrong. The curators at the NMNH and CAS are negotiating this matter, and since the type repository may change, future workers should contact both institutions.

*Diagnosis.*—Characterized by large, branched sternal process of anterior gonopods, covering telopodite, length subequal to that of colpocoxite; latter apically broad, truncate, without setae; flagellocoxite with long flagella.

*Holotype.*—Ocellaria with rows of 5, 4 and 1 ocelli, respectively.

Collum l/w ratio 60%. Pleurotergite 2–3 with margins truncate and rounded, respectively; that of segment 4 with margin obliquely truncate, caudal corner produced. Striae faint on all segments. Dorsal setae slender. Body length 9 mm.

Leg 2  $\frac{1}{3}$  as long as first leg, tarsus minute, tarsal claw absent; gonapophysis longer than leg. Leg 3 coxa spatulate, apically rounded; telopodite short, all podomeres slightly swollen.

Anterior gonopod (Figs. 215, 216) sternal process extending around caudal side of telopodite, terminating in two long, acute branches, mesal branch apically bifurcate, length subequal to that of colpocoxite. Latter apically broad, truncate, without setae, with slender acute anterior projection. Flagellocoxite with long flagella closely appressed to caudal surface of colpocoxite. Telopodite minute, completely obscured by sternal process.

Posterior gonopod (Fig. 217) sternum mesally concave, extending to level of coxal endite. Latter divided into short, acute lateral and long, tapered mesal



processes. Telopodite ovoid in profile, inner surface strongly concave, with lateral sulcus, ventral margin rounded. Leg 10 coxa with elongate mesal process.

*Female paratype.*—Cyphopod valves low, subequal (Fig. 218).

*Distribution.*—Known only from the type locality.

*Remarks.*—Though collected in a cave, *siliquae* lacks specializations and probably is a troglophile as noted by Causey (1963).

### *Opiona distincta*, NEW SPECIES

(Figs. 57–59, 101)

*Type specimens.*—Male holotype and one male and two female paratypes (UCD) collected by J. S. Buckett, 29 November 1968, 2.5 mi SE Guerneville, Sonoma Co., CA.

*Diagnosis.*—Characterized by long, acicular sternal process curving caudad around telopodite then anteriad between colpocoxites; latter broad, with anterior and posterior distal projections, former curving mesad, latter narrow, acute, and without setae; flagellocoxite with numerous flagella.

*Holotype.*—Ocellaria with rows of 5, 3 and 1 ocelli, respectively; relative proportions of antennomeres 0.4, 0.9, 2.3, 1.3, 1.9, 1.0, 0.6.

Collum l/w ratio 60%. Pleurotergites 2–3 with margins truncate and rounded, respectively; that of segment 4 with margin obliquely truncate, caudal corner produced. Striae faint. Dorsal setae well developed. Body length 8 mm.

Leg 2 ½ as long as 1st leg; gonapophysis longer than telopodite. Leg 3 coxa apically broad; telopodite shorter than that of 2nd leg, tarsus minute, other segments slightly swollen.

Anterior gonopod (Figs. 57, 58) sternal process long, acicular, extending caudally around telopodite and cephalad between colpocoxites. Latter broad, with anterior and posterior distal projections, former short, acute, curving mediad, latter short, acuminate, without setae. Flagellocoxite with rounded basal sclerite and numerous flagella closely appressed to colpocoxite. Telopodite bulbous, ovoid, mostly concealed by sternal process.

Posterior gonopod (Fig. 59) sternum extending to level of apodeme, slightly concave medially. Coxal endite long, curving laterad. Telopodite ovoid, with lateral sulcus, ventral margin rounded. Leg 10 coxa with clavate mesal process.

*Female paratype.*—Cyphopod valves broad, mesal one slightly larger. Leg 3 telopodite with three segments (Fig. 101).

*Distribution.*—Known only from the type locality.

### *Opiona bifurcata*, NEW SPECIES

(Figs. 60–63)

*Type specimens.*—Male holotype (UCD) collected by J. S. Buckett, M. R. Gardner, and J. R. Helfer, 21 December 1964, at Russian Gulch State Park, 2 mi N Mendocino, Mendocino Co., CA. One male paratype (UCD) collected by R. D. Clemens, 8 April 1971, 4 mi S Fort Bragg, Mendocino Co., CA.

*Diagnosis.*—Characterized by short, truncate sternal process; colpocoxite with three apical divisions, central division with prominent mesal projection, posterior division flattened, laminate, without setae; flagellocoxite with numerous flagella.

*Holotype.*—Ocellaria with rows of 6, 4 and 1 ocelli, respectively; relative proportions of antennomeres 0.4, 1.5, 2.5, 1.6, 2.1, 1.0, 0.8.

Collum l/w ratio 56%. Pleurotergites 2–3 with margins truncate and rounded, respectively; that of segment 4 with margin obliquely truncate, caudal corner produced. Striae faint. Dorsal setae well developed.

Leg 2 about  $\frac{1}{3}$  as long as 1st leg; gonapophysis longer than telopodite. Leg 3 coxa apically rounded; telopodite shorter than that of 2nd leg, tarsus minute, other segments swollen.

Anterior gonopod (Figs. 60, 61) sternal process short, broad, truncate, partly obscuring telopodite. Colpocoxite broad, with three apical divisions, anterior division short, acute, central division broad, with prominent curved mesal projection, posterior division (pd, Fig. 60) flattened, laminate, without setae. Flagellocoxite with rounded basal sclerite, flagella numerous, closely appressed to colpocoxite. Telopodite short, narrow, partly concealed by sternal process.

Posterior gonopod (Figs. 62, 63) sternum extending to lateral margin of coxa, with narrow, subacuminate mesal projection. Coxal endite long, broad basally, narrowing then expanding at midlength, tapering and curving distally to acute tip, situated in mesal concavity on telopodite. Latter ovoid, ventral margin rounded, with lateral sulcus. Leg 10 coxa with elongate, subcylindrical mesal process, tapering distad to rounded apex.

*Distribution.* — Known only from the type and paratype localities.

*Remarks.* — *Opiona bifurcata* occurs sympatrically with *Opiona exigua* at Russian Gulch State Park, the only known instance of sympatry in the genus.

### *Opiona berryessae*, NEW SPECIES

(Figs. 64–66, 109)

*Type specimens.* — Male holotype and one female paratype (UCD) collected by J. S. Buckett and M. R. Gardner, 12 November 1969, 12 mi W Winters, Napa Co., CA.

*Diagnosis.* — Characterized by basally broad sternal process, apically acuminate and curled; colpocoxite with three distal divisions, anterior curving mesad, posterior rounded, directed mesad, apically setose; flagellocoxite with numerous very fine flagella.

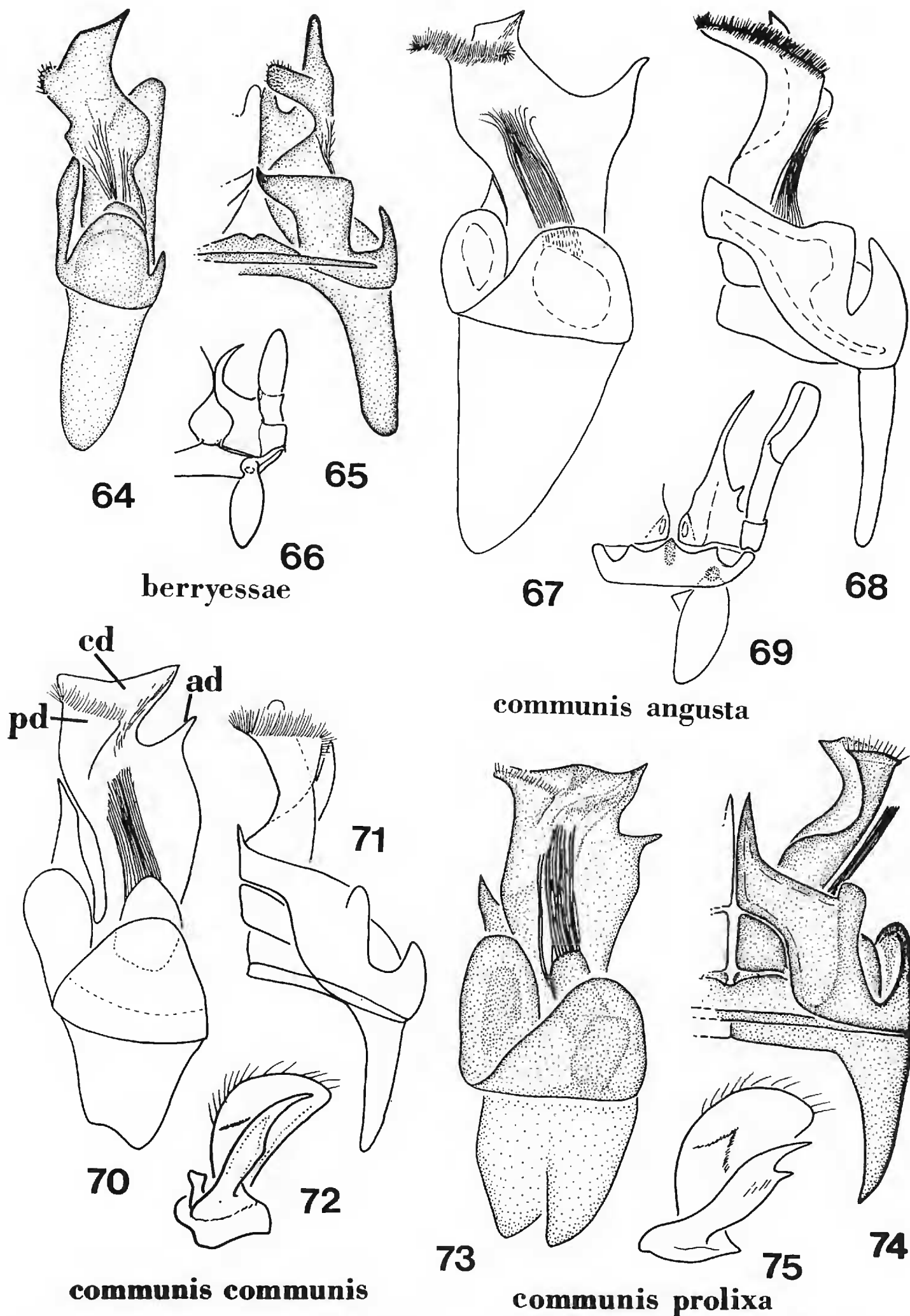
*Holotype.* — Ocellaria with rows of 6, 4 and 3 ocelli, respectively; relative proportions of antennomeres 0.4, 0.9, 2.2, 1.1, 1.6, 1.0, 0.6.

Collum l/w ratio 65%. Pleurotergites 2–3 with margins truncate and rounded, respectively; that of segment 4 with margin obliquely truncate and folded mesad, with two marginal notches. Striae faint on all segments. Dorsal setae well developed. Body length 8 mm.

Leg 2 about  $\frac{1}{4}$  as long as 1st leg, tarsus minute; gonapophysis longer than telopodite. Leg 3 coxa spatulate, with large rounded apical lobe; telopodite short, directed laterad, tarsus minute.

Anterior gonopod (Figs. 64, 65) sternal process broad basally, tapering to acuminate tip, curling anteromesad, partly obscuring telopodite. Colpocoxite broad with three distal divisions, anterior division rounded, curving strongly mesad, central division truncate, anterior corner sharply acute, posterior division rounded, directed mesad, apically setose. Flagellocoxite with rounded basal sclerite, flagella relatively short and very fine, closely appressed to colpocoxite. Telopodite short, flat, mostly concealed by sternal process.

Posterior gonopod (Fig. 66) sternum terminating at level of apodeme, slightly concave medially. Coxal endite broad basally, divided into short, acute lateral



Figures 64-75. *Opiona* spp. males. 64-66. *O. berryessae* holotype. 64. Left anterior gonopod, lateral aspect. 65. The same, posterior aspect. 66. Right posterior gonopod, anterior aspect. 67-69. *O. communis angusta* holotype. 67. Left anterior gonopod, lateral aspect. 68. The same, posterior aspect. 69. Right posterior gonopod, anterior aspect. 70-72. *O. c. communis* holotype. 70. Left anterior gonopod, lateral aspect. 71. The same, posterior aspect. 72. Left posterior gonopod, mesal aspect. 73-75. *O. c. proluxa* holotype. 73. Left anterior gonopod, lateral aspect. 74. The same, posterior aspect. 75. Left posterior gonopod, mesal aspect.

and long falcate mesal processes. Telopodite small, laterally flattened, ventral margin rounded, with lateral sulcus. Leg 10 coxa with broad mesal process.

*Female paratype.*—Cyphopod valves small, unequal, mesal valve larger. Receptacle (r, Fig. 109) relatively large, longer than width of valves, extending beneath latter to opposite side.

*Distribution.*—Known only from the type locality.

*Remarks.*—*Opiona berryessae* was discovered in a dry area in the innermost Coast Range.

### *Opiona communis*, NEW SPECIES

*Diagnosis.*—Characterized by sternal process variably prolonged apically; colpocoxites flattened, with three distal divisions, anterior one short, acute, separated to varying degrees from variably linear central division, posterior division flattened, laminate, apically setose; flagellocoxite with numerous flagella.

*Remarks.*—We judge three closely similar forms in the San Francisco Bay area of central California to be races of a single widespread species. Intermediate forms are currently lacking, but the degree of similarity, greater than that between other forms of *Opiona*, justifies subspecific recognition.

### *Opiona communis communis*, NEW SUBSPECIES

(Figs. 70–72, 100)

*Type specimens.*—Male holotype and female paratype (UCD) collected by J. S. Buckett, 20 December 1969, 3 mi N Kenwood, Sonoma Co., CA. Additional paratypes as follows: *Solano Co.*, 2.5 mi W Cordelia, M, F, 25 Nov 1964, J. S. Buckett (UCD). *Santa Cruz Co.*, 12 mi N Boulder Cr., 4 M, F, 22 Jan 1955, D. Burdick and M. Washbauer (CIS).

*Diagnosis.*—Sternal process of anterior gonopods slightly prolonged apically; central division of colpocoxite relatively long, overhanging and narrowly separated from anterior; coxal endite of posterior gonopod with suggestion of tooth at midlength.

*Holotype.*—Ocellaria with rows of 6, 4 and 2 ocelli, respectively; relative proportions of antennomeres 0.3, 0.8, 1.9, 1.2, 1.5, 1.0, 0.5.

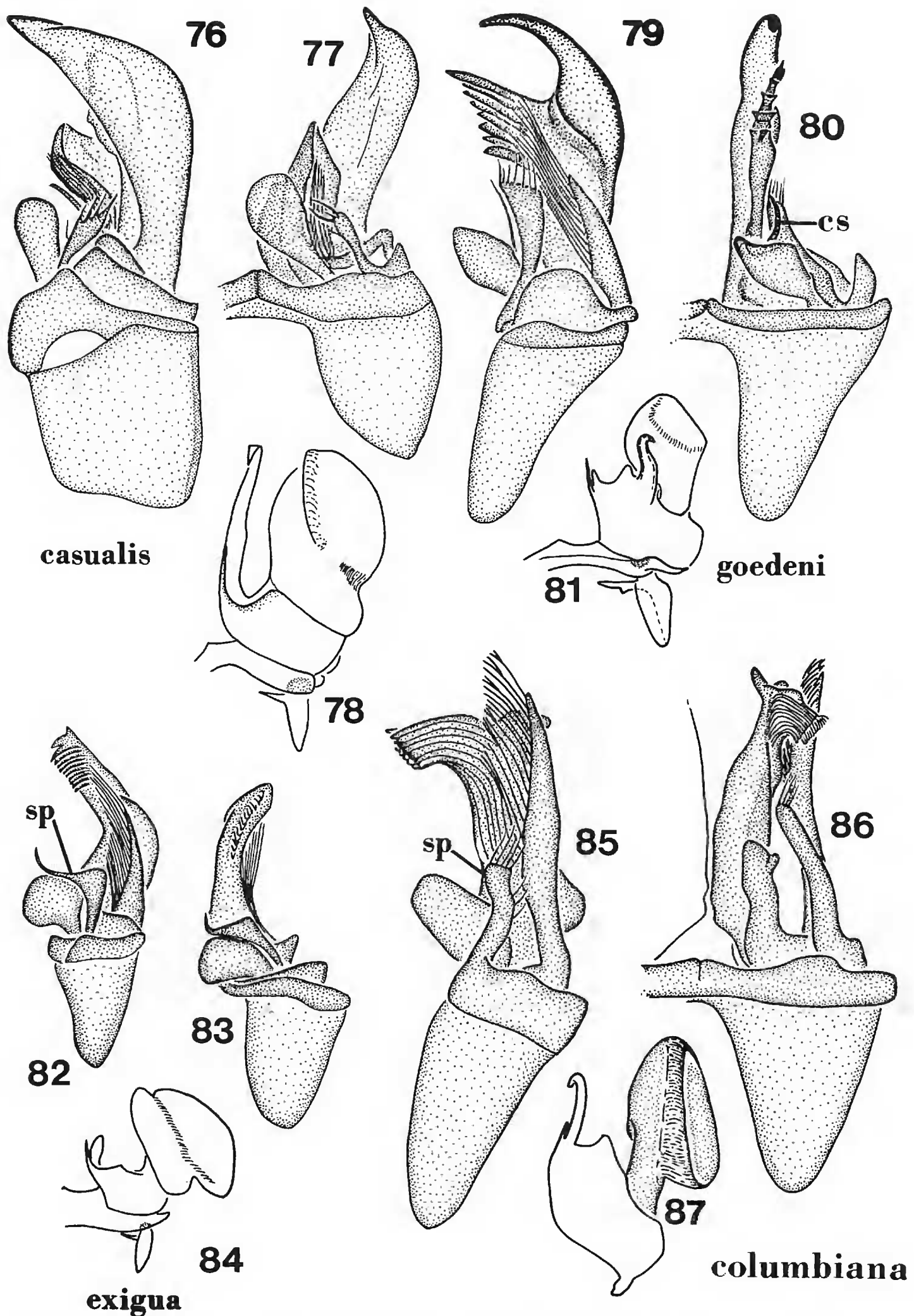
Pleurotergites 2–3 with margins truncate and rounded, respectively, that of segment 4 with margin obliquely truncate, caudal corner produced.

Leg 2  $\frac{1}{4}$  as long as 1st leg, telopodite crassate; gonapophysis longer than telopodite. Leg 3 coxa apically broad, rounded; telopodite about  $\frac{1}{2}$  as long as coxa, directed laterad, tarsus minute.

Anterior gonopod (Figs. 70, 71) sternal process slightly prolonged, apically acute. Colpocoxite with short acute anterior division (ad, Fig. 70) narrowly separated from central division (cd); latter relatively long, overhanging former; posterior division (pd) flattened, laminate, curving mesad in semicircular arc. Flagellocoxite with ovoid basal sclerite, flagella numerous, narrowly separated from colpocoxite. Telopodite small, bulbous.

Posterior gonopod (Fig. 72) sternum extending to lateral margin of coxa, with short acute mesal process. Coxal endite falcate, with suggestion of tooth at midlength. Telopodite subovoid, laterally flattened, with shallow lateral sulcus. Leg 10 coxa with cylindrical mesal process.

*Distribution.*—Known only from the type and paratype localities.



Figures 76–87. *Opiona* spp. males. 76–78. *O. casualis* holotype. 76. Left anterior gonopod, lateral aspect. 77. The same, posterior aspect. 78. Right posterior gonopod, anterior aspect. 79–81. *O. goedeni* paratype, Clatsop Co., OR. 79. Left anterior gonopod, lateral aspect. 80. The same, posterior aspect. 81. Right posterior gonopod, anterior aspect. 82–84. *O. exigua*. 82. Left anterior gonopod of topoparatype, lateral aspect. 83. The same, posterior aspect. 84. Right posterior gonopod of paratype from Sonoma Co., CA, anterior aspect. 85–87. *O. columbiana* from King Co., WA. 85. Left anterior gonopod, lateral aspect. 86. The same, posterior aspect. 87. Right posterior gonopod, anterior aspect.

***Opiona communis angusta*, NEW SUBSPECIES**

(Figs. 67–69)

*Type specimens.*—Male holotype and five male and five female paratypes (UCD) collected by J. S. Buckett, 26 November 1964, along Bennett Valley Rd., 6 mi SSE Santa Rosa, Sonoma Co., CA. Two male and two female paratypes (UCD) taken by same collector, 24 December 1964, 6 mi N Cloverdale, Sonoma Co.

*Diagnosis.*—Sternal process of anterior gonopods (Figs. 67, 68) not prolonged apically; central division of colpocoxite relatively short, widely separated from and not overhanging anterior division; coxal endite of posterior gonopod broad basally, distally acicular, with short basal spur (Fig. 69).

*Distribution.*—Coastal California north of San Francisco Bay. In addition to the types, specimens were examined from the following localities:

*Marin Co.*, 1 mi S Inverness, M, F, 30 Jan 1959, D. D. Linsdale (FSCA). *Sonoma Co.*, 2 mi E Santa Rosa, 11 M, 18 F, juvs., 3 Feb 1962, J. S. Buckett (FSCA).

***Opiona communis prolixa*, NEW SUBSPECIES**

(Figs. 73–75)

*Type specimens.*—Male holotype and two female paratypes (UCD) collected by R. Raney and R. O. Schuster, 3 January 1958, 7 mi W Oakville, Napa Co., CA. One male and two female paratypes (UCD) connected by J. S. Buckett and M. R. Gardner, 26 November 1964, 7 mi NE Santa Rosa, Sonoma Co., CA.

*Diagnosis.*—Sternal process of anterior gonopods (Figs. 73, 74) greatly prolonged apically; central division of colpocoxite relatively long, narrowly separated from but not overhanging anterior division, latter directed cephalad; coxal endite of posterior gonopod with distinct subapical tooth (Fig. 75).

*Distribution.*—Eastern Sonoma and Napa counties, California. One male topotype, collected by R. O. Schuster and L. M. Smith, 13 Dec 1957, is available in the NMNH. Also known from the following locality:

*Napa Co.*, Mt. St. Helena, M, 31 Dec 1953, R. O. Schuster and G. A. Marsh (NMNH).

***Opiona goedeni*, NEW SPECIES**

(Figs. 79–81, 108)

*Type specimens.*—Male holotype and one male and four female paratypes (AMNH) collected by E. M. Benedict, 27 November 1971, 1.7 mi SW Timber, Washington Co., OR. Other paratypes, all from Oregon, as follows: *Clatsop Co.*, Saddle Mountain St. Pk., M, 4 F, 29 Nov 1968, K. Goeden (UCD); 3 mi SE Olney, 2 M, 27 Nov 1971, EMB (WAS); 5 mi N, 7 mi W Elsie, 4 M, 2F, 15 Mar 1972, EMB (WAS). *Polk Co.*, 4.7 mi E Valsetz, M, 20 Nov 1968, E. M. Fisher (UCD).

*Diagnosis.*—Characterized by relatively long, apically blunt and setose sternal process; colpocoxite strongly falcate distally, with basal spiniform process and broad, serrate caudal projection at midlength; flagellocoxite conical, with around eleven flagella arising from caudal margin.

*Holotype.*—Ocellaria with rows of 6, 5, 3 and 1 ocelli, respectively; relative proportions of antennomeres 0.3, 1.0, 1.8, 1.0, 1.5, 1.0, 0.7.

Collum l/w ratio 55%. Pleurotergites 2–3 with margins straight and rounded, respectively, former terminating below latter; that of segment 4 with margin rounded, terminating above that of segment 3. Striae distinct. Dorsal setae slender, nearly twice as long on caudal segments. Body length 10 mm.

Leg 1 crassate; femur, postfemur, and tibia broad, with several erect setae. Leg 2 about  $\frac{1}{2}$  as long as 1st leg, tarsus minute, without claw but with three long, curved, terminal setae; gonapophysis  $\frac{3}{4}$  as long as telopodite. Leg 3 coxa with rounded distal lobe extending beyond telopodite articulation; latter directed laterad, short, prefemur expanded, less than combined lengths of distal podomeres; tarsal claw rudimentary.

Anterior gonopod (Figs. 79, 80) sternal process clavate and truncate, with seven short apical setae. Colpocoxite broad basally, with basal spiniform process (ps, Fig. 80), and broad, serrate and striate caudal projection at midlength, distally falcate, curving caudad and tapering smoothly to acuminate tip. Flagellocoxite moderately long, conical, with eleven flagella arising from caudal margin. Telopodite petiolate, directed mesad.

Posterior gonopod (Fig. 81) sternum extending to lateral margin of coxa, mesally concave. Coxal endite broad, with unciniate lateral projection and two small mesal knobs. Telopodite relatively small, anterior margin convex, caudal margin concave, with lateral, longitudinal sulcus. Leg 10 coxa with cylindrical mesal process.

*Female paratype.*—Cyphopod with lateral valve slightly irregular in shape, mesal valve larger, with rounded posterior lobe (Fig. 108).

*Distribution.*—Northwestern Oregon, from Polk to Clatsop counties. In addition to the types, specimens were examined from the following locality:

*Washington Co.*, 2 mi S Timber, M, 3 F, 1 Dec 1948, I. Newell (AMNH).

### *Opiona columbiana* Chamberlin

(Figs. 85–87, 103)

*Opiana columbiana* Chamberlin, 1951:81, figs. 15–19; Chamberlin and Hoffman, 1958:88; Kevan, 1983:2967.

*Opiona hatchi* Causey, 1954:81, figs. 1–3; Chamberlin and Hoffman, 1958:87; Kevan, 1983:2968. NEW SYNONYMY.

*Type specimens.*—Male holotype and one female paratype (PMBC) taken by unknown collector on unknown date in 1949 at Victoria, Vancouver Island, British Columbia, Canada. The original description (Chamberlin, 1951) states that two females were part of the original sample, but only one is present at the PMBC. The gonopods and second and third legs of the male were illustrated by Chamberlin, but they are no longer with the specimen. Their location and that of the other female are unknown. The following description was therefore prepared from a male from Seattle, King Co., Washington.

*Diagnosis.*—Characterized by relatively long, truncate, apically setose sternal process of anterior gonopods; colpocoxite curving anteriorly apically with long, serrate and striate caudal projection distal to midlength, curving broadly caudad; flagellocoxite long, subequal to length of colpocoxite, flagella arising from caudal margin, some bifurcate.

*Male from King Co., Washington.*—Ocellaria with rows of 6, 4 and 2 ocelli, respectively; relative proportions of antennomeres 0.3, 0.9, 2.2, 1.3, 1.7, 1.0, 0.7.

Collum l/w ratio 66%. Margin of pleurotergite 2 with caudal corner short, acute; that of segment 3 broad, concave; anterior corner of 4th pleurotergite produced, acute, extending below level of 3rd pleurotergite. Striae distinct. Dorsal setae larger on caudal segments. Body length 14 mm.

Leg 1 crassate. Leg 3 coxa spatulate, with ventral, subconical, spiculate lobe; telopodite shorter than that of 2nd leg, prefemur expanded and flattened, longer than remaining podomeres.

Anterior gonopod (Figs. 85, 86) sternal process relatively long, apically truncate with three subterminal and five apical setae. Colpocoxite with relatively long caudal projection distal to midlength, striate and serrate, with two rows of apical teeth, curving broadly caudad; stem curving slightly anteriorly apically, tip subacuminate. Flagellocoxite subequal in length to colpocoxite, tapering distad, with about 15 flagella arising from caudal margin, some flagella apically bifurcate. Telopodite short and broad, not petiolate, directed caudad.

Posterior gonopod (Fig. 87) sternum extending to lateral margin of coxa. Coxal endite with falcate mesal projection and short blunt spur adjacent to telopodite. Latter with marginal rim anteriorly and dorsal emargination demarcating distal lobe. Leg 10 coxa with slender mesal process.

*Female paratype.*—Cyphopod valves unequal, extending caudad into rounded lobes, mesal valve larger (Fig. 103).

*Distribution.*—From the Puget Sound area of Washington to southern British Columbia, both the mainland and Vancouver Island. In addition to the types, specimens were examined from the following localities:

CANADA. BRITISH COLUMBIA: Vancouver, M, 18 Apr 1953, H. B. Leech (NMNH).

USA. WASHINGTON: *King Co.*, Carkeek Park, Seattle, M, 12 May 1954, M. H. Hatch (AMNH).

*Remarks.*—Although the genitalia of the holotype are lost, Chamberlin's sketch (1951) of the anterior gonopods from lateral view vaguely resembles those of *hatchi*, except for omission of the flagellocoxite. In particular, the distal configuration in his drawing is very close to that in *O. hatchi*, and the male from Vancouver (NMNH) is essentially identical to the type of *O. hatchi*. We therefore consider all these forms to be conspecific, with *O. columbiana* the senior name.

### *Opiona casualis*, NEW SPECIES

(Figs. 49–52, 76–78, 107)

*Type specimens.*—Male holotype and one female paratype (UCD) collected by E. M. Fisher, 20 November 1968, 2 mi E Valsetz, Polk Co., OR. One female paratype (WAS) collected by E. M. Benedict, 20 December 1972, 1.4 mi N Nashville, Lincoln Co., OR.

*Diagnosis.*—Characterized by relatively short, clavate, apically setose sternal process; colpocoxite curving strongly caudad distally, expanding broadly at midlength; flagellocoxite short, narrow, bent caudad basally and not projecting ventrad, flagella arising terminally.

*Holotype.*—Ocellaria with rows of 6, 5, 3 and 1 ocelli, respectively; relative proportions of antennomeres 0.2, 0.9, 1.9, 1.1, 1.5, 1.0, 0.7.

Collum l/w ratio 64%. Pleurotergites 2–3 with margins straight and rounded, respectively; that of segment 4 with caudal corner produced. Body length 12 mm.



Leg 1 with slight rounded ventral lobes on postfemur and tibia (Fig. 49). Leg 2  $\frac{1}{2}$  as long as 1st leg, tarsus minute, claw absent (Fig. 50); gonapophysis  $\frac{2}{3}$  as long as telopodite. Leg 3 coxa very long, with blunt, medially directed, distal lobe (Fig. 51); telopodite shorter than coxa, prefemur flattened with ventral surface expanded, length subequal to that of remaining podomeres, claw absent. Leg 7 with slight, rounded coxal lobe (Fig. 52).

Anterior gonopod (Figs. 76, 77) sternal process relatively short, clavate, apically setose. Colpocoxite narrow basally, with moderate, smooth projection from caudal surface proximal to midlength, stem expanding greatly at midlength into hood-like structure, narrowing rapidly distad and curving strongly caudad, tip subacuminate. Flagellocoxite long and narrow, bent caudad basally and not directed ventrad, flagella arising apically. Telopodite petiolate, directed mesad.

Posterior gonopod (Fig. 78) sternum extending to lateral margin of coxa, medially concave. Coxal endite long, slender, length subequal to that of telopodite, apically blunt. Telopodite with prominent lateral sulcus and short anterior marginal rim. Leg 10 coxae with small, mesal process.

*Female paratype.*—Cyphopod valves relatively large, unequal, mesal slightly larger (Fig. 107).

*Distribution.*—Known only from the type and paratype localities.

***Opiona exigua*, NEW SPECIES**  
(Figs. 82–84, 110)

*Type specimens.*—Male holotype and three male and seven female paratypes (UCD) collected by J. S. Buckett, M. R. Gardner, and J. R. Helfer, 22 December 1964, at Russian Gulch St. Pk., Mendocino Co., CA. Four male and 15 female paratypes (UCD) collected by R. O. Schuster and F. Raney, 22 January 1958, near Mark West Reserve, Sonoma Co., CA.

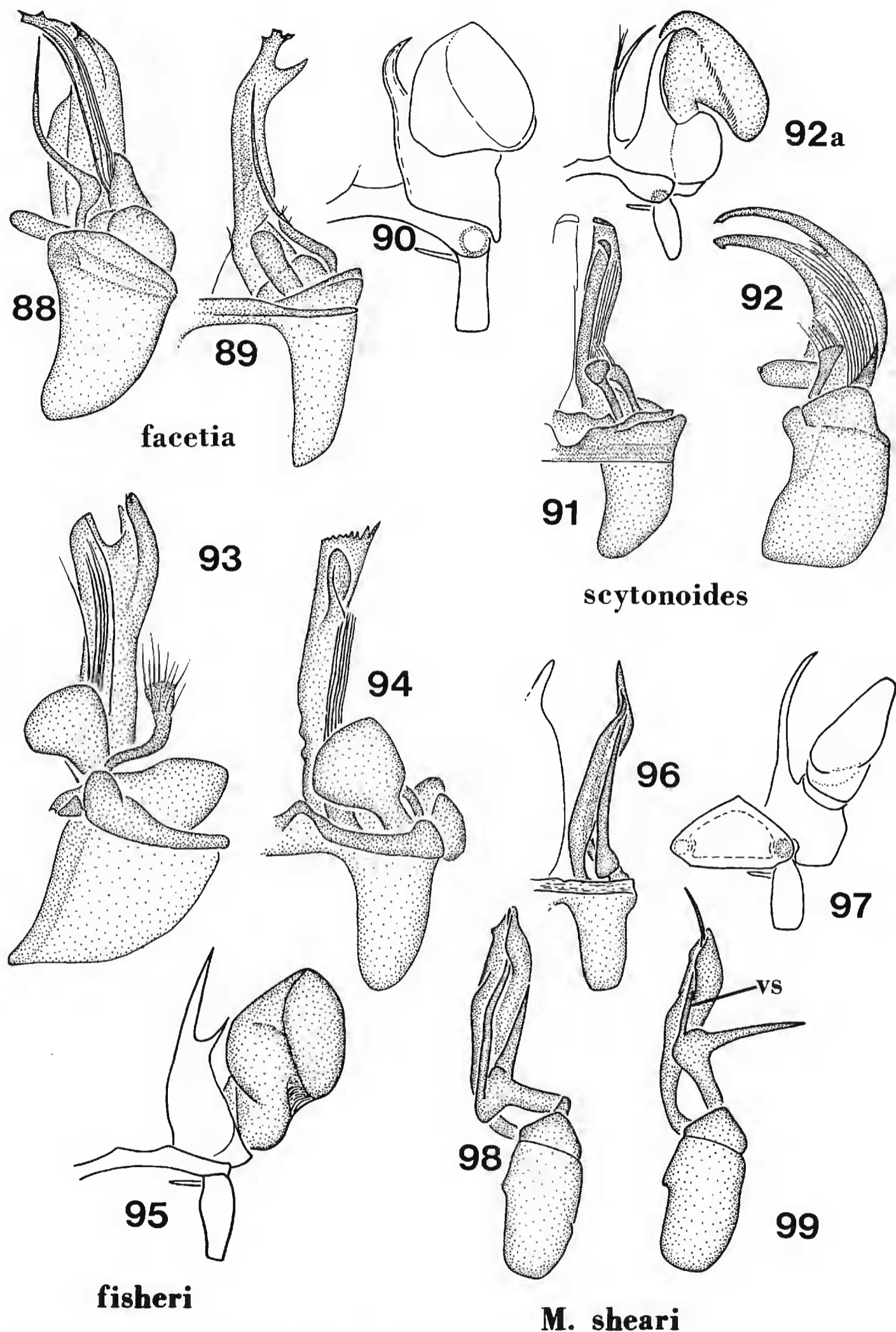
*Diagnosis.*—Characterized by relatively long sternal process, expanding at midlength and bent caudomesad, tapering to acuminate, curled tip, not setose; colpocoxite curving broadly caudad, apically blunt, without caudal projection but distocaudal margin serrate and lateral surface striate; flagellocoxite moderately long, conical, flagella arising from caudal margin.

*Holotype.*—Ocellaria with rows of 4 and 2 ocelli, respectively; relative proportions of antennomeres 0.5, 0.7, 1.9, 1.0, 1.4, 1.0, 0.6.

Collum l/w ratio 61%. Pleurotergite 2 with margin straight; that of segment 3 with marginal notch caudad to accommodate femur of 1st leg; margin of 4th pleurotergite rounded. Striae distinct in midbody region, faint on caudal segments. Dorsal setae large on anterior segments, becoming distinctly spatulate on segment 9, increasing in size through segment 25, then decreasing to segment 29. Body length 8 mm.

Leg 1 prefemur short, femur elongate. Leg 2 telopodite  $\frac{1}{4}$  as long as that of 1st leg; gonapophysis longer than telopodite. Leg 3 coxa expanding beyond telopodite articulation into rounded lobe; telopodite subequal to that of 2nd leg, directed laterad, prefemur flattened, much larger than remaining segments. Legs 4–7 with coxae slightly swollen.

Anterior gonopod (Figs. 82, 83) sternal process expanding at midlength and bent sharply caudomesad, tapering to curled, acuminate tip. Colpocoxite curving broadly caudad, without caudal projection but distocaudal margin serrate and



Figures 88–99. *Opiona* spp. and *Metopiona sheari* males. 88–90. *O. facetia* holotype. 88. Left anterior gonopod, lateral aspect. 89. The same, posterior aspect. 90. Right posterior gonopod, anterior aspect. 91–92a. *O. scytonotoides* holotype. 91. Left anterior gonopod, posterior aspect. 92. The same, lateral aspect. 92a. Right posterior gonopod, anterior aspect. 93–95. *O. fisheri* holotype. 93. Left anterior gonopod, lateral aspect. 94. The same, posterior aspect. 95. Right posterior gonopod, anterior aspect.

lateral surface striate, stem apically blunt. Flagellocoxite about half as long as colpocoxite, conical, with numerous fine flagella arising from caudal surface and directed along axis of colpocoxite. Telopodite broadly petiolate.

Posterior gonopod (Fig. 84) sternum extending to lateral margin of coxa. Coxal endite short, divided into two subequal mesal projections, anterior one narrow and curved, posterior one ovoid, with spur adjacent to telopodite. Latter with outer surface completely margined, caudal and ventral surfaces with submarginal sulci. Leg 10 coxa with long narrow mesal cylindrical process.

*Female paratype.*—Cyphopod valves broadly rounded and unequal, mesal valve larger; receptacle relatively large (Fig. 110).

*Distribution.*—Known only from the type and paratype localities.

*Remarks.*—The specimens from Mendocino County were recovered from red-wood litter berlesate.

***Opiona facetia*, NEW SPECIES**  
(Figs. 53, 88–90)

*Type specimens.*—Male holotype and two male paratypes (UCD) collected by R. L. Westcott, 28 February 1969, at Outlook, Clackamas Co., OR. One male and one female paratypes (WAS) collected by E. M. Benedict, 26 March 1972, 9 mi S, 6 mi E Silverton, Marion Co., OR.

*Diagnosis.*—Characterized by long, acicular sternal process, bent caudomesad proximally; colpocoxite curving slightly caudad distally, caudal margin not expanded, serrate, or striate, divided apically, lateral branch acuminate, mesal branch irregularly notched; flagellocoxite with short, broadly subtriangular basal sclerite and long, filamentous flagella arising from caudal margin.

*Holotype.*—Ocellaria with rows of 6, 6, 3 and 1 ocelli, respectively; relative proportions of antennomeres 0.4, 1.4, 3.3, 1.7, 2.5, 1.5, 1.0.

Collum l/w ratio 50%. Pleurotergite 2 with margin indented slightly; that of segment 3 with margin rounded; 4th pleurotergite caudal corner produced. Striae distinct. Dorsal setae slender. Body length 9 mm.

Leg 3 coxa with long, conical, ventral lobe; telopodite much shorter than that of 2nd leg, prefemur broadly expanded and flattened, longer than distal podomeres. Legs 4–7 with small coxal swellings.

Anterior gonopod with articulation of sternum, coxal plate, and coxal sclerites as shown in Figure 53. Sternal process (Figs. 88, 89) long, acicular, expanding and bent caudomesad proximally then narrowing, curving broadly ventrad, and extending nearly to distal extremity of colpocoxite. Latter curving caudad distad, caudal margin smooth, not expanded or modified, divided distally into short, acuminate lateral branch and irregularly notched mesal branch. Flagellocoxite with short, broadly subtriangular basal sclerite, flagella long, filamentous, arising from caudal margin, extending nearly to tip of colpocoxite. Telopodite oblong, not expanded distally.

Posterior gonopod (Fig. 90) sternum extending to lateral margin of coxa, mesally

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96–99. *Metopiona sheari*. 96. Left anterior gonopod of holotype, posterior aspect. 97. Right posterior gonopod of the same, anterior aspect. 98. Left anterior gonopod of paratype, lateral aspect. 99. Left anterior gonopod of holotype, lateral aspect.

concave. Coxal endite falcate, curving laterad, extending nearly to distal extremity of telopodite. Latter with outer surface circumscribed by submarginal rim. Leg 10 coxa with small lateral swelling, and elongate mesal process.

*Distribution.*—Known only from the type and paratype localities.

***Opiona fisheri*, NEW SPECIES**  
(Figs. 93–95, 102, 104, 105)

*Type specimens.*—Male holotype and one male and two female paratypes (UCD) collected by E. M. Fisher, 12 November 1968, at Neptune State Park, Lane Co., OR. One male and numerous female and juvenile paratypes (WAS) collected by E. M. Benedict, 20 December 1971, along the Yaquina River, 0.6 mi NW Elk City, Lincoln Co., OR.

*Diagnosis.*—Characterized by long, clavate, apically setose sternal process, curving anteriorly basally then bending caudad; colpocoxite upright, divided apically into rounded caudal branch and expanded, serrate anterior branch; flagellocoxite with short, oblong basal sclerite, flagella arising apically.

*Holotype.*—Ocellaria with rows of 6, 5, 3, and 1 ocelli, respectively; relative proportions of antennomeres 0.3, 0.9, 2.0, 1.2, 1.4, 1.0, 0.6.

Collum l/w ratio 50%. Margin of the pleurotergite with caudal corner produced. Striae distinct. Dorsal setae slightly larger on caudal segments. Body length 11 mm.

Leg 3 coxa with conical distal projection; telopodite shorter than that of 2nd leg, prefemur expanded, flattened, longer than distal podomeres, tarsus minute, claw absent.

Anterior gonopod (Figs. 93, 94) sternal process relatively long, narrow, and clavate, curving anteriorly basally then ventrad, apically setose. Colpocoxite upright, divided apically into smooth, rounded caudal branch and expanded, serrate anterior branch. Flagellocoxite with short basal sclerite obscured by telopodite, with about 10 long, fine flagella arising apically. Telopodite relatively large, greatly expanded, petiolate.

Posterior gonopod (Fig. 95) sternum extending to lateral margin of coxa, medially concave. Coxal endite long and spiniform, extending nearly to distal extremity of telopodite, with acute lateral spur at midlength. Telopodite with lateral sulcus. Leg 10 coxa with rounded lateral lobe, and short, broad mesal process.

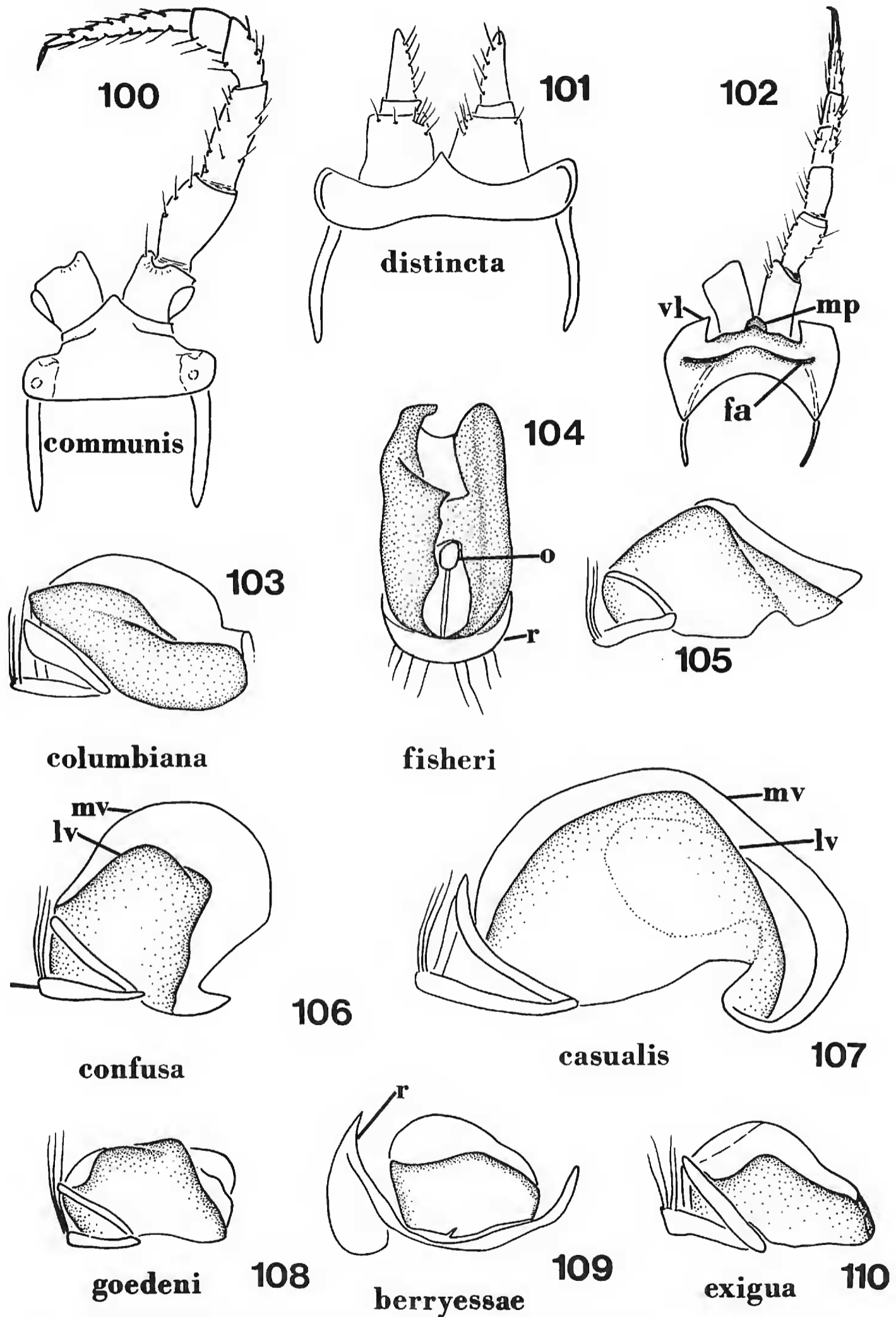
*Female paratype.*—Pleuroterga of segment 4 (Fig. 102) with laminate ventral projection lateral to 3rd legs; sternum with short, blunt mesal projection, and flattened areas on anterior surface. Cyphopod valves rounded anteriorly, slightly extended and pointed posteriorly, mesal valve slightly larger (Figs. 104, 105).

*Distribution.*—Known only from the type and paratype localities.

***Opiona scytonotoides*, NEW SPECIES**  
(Figs. 91, 92, 92a)

*Type specimen.*—Male holotype (AMNH) collected by E. M. Benedict, 6 November 1971, along OR hwy. 227 at Canyonville Park, 2 mi E Canyonville, Douglas Co., OR.

*Diagnosis.*—Characterized by short, clavate, apically setose sternal process; colpocoxite curving broadly caudad, divided distal to midlength into two long, parallel, subequal branches; flagellocoxite with short, subconical, basal sclerite, flagella arising from caudal margin and curving parallel to colpocoxite.



Figures 100-110. *Opiona* spp. females. 100-102. Legs. 100. Leg 2 of *O. communis communis* paratype, posterior aspect. 101. Leg 2 of *O. distincta* topoparatype, posterior aspect. 102. Leg 3 of *O. fisheri* paratype, anterior aspect. 103, 105-110. Right cyphopod, lateral aspect. 103. *O. columbiana*, Vancouver Island. 104. Right cyphopod of *O. fisheri* topoparatype, anteroventral aspect. 105. *O. fisheri* topoparatype. 106. *O. confusa* topoparatype. 107. *O. casualis* topoparatype. 108. *O. goedeni* paratype, Clatsop Co., OR. 109. *O. berryessae* topoparatype. 110. *O. exigua* topoparatype.

*Holotype*. — Ocellaria with rows of 4, 3 and 2 ocelli, respectively; relative proportions of antennomeres 0.3, 1.1, 2.2, 1.4, 1.7, 1.0, 0.6.

Collum l/w ratio 63%. Margin of 4th pleurotergite rounded. Body length 8 mm.

Leg 3 coxa with narrow, rounded, apically setose distal lobe; telopodite with prefemur broadened, distal podomeres small.

Anterior gonopod (Figs. 91, 92) sternal process leaning slightly mesad, relatively short, distally clavate, apically setose. Colpocoxite curving broadly caudad, divided distal to midlength into two long, parallel, and subequal branches, apically blunt. Flagellocoxite with short, subconical basal sclerite, flagella arising from caudal margin, curving parallel to colpocoxite. Telopodite relatively long and narrow, distally rounded.

Posterior gonopod (Fig. 92a) sternum extending to midlength of coxa, mesally concave. Coxal endite divided basally into long, curved lateral branch, closely appressed to mesal surface of telopodite, and narrow mesal branch, latter subdivided into two acicular subbranches, anterior one with several fine terminations. Telopodite expanded broadly laterad, without sulci. Leg 10 coxa unmodified.

*Distribution*. — Known only from the type locality.

*Remarks*. — The specific name refers to the superficial resemblance of the gonopods to those of the polydesmoid genus *Scytonotus*.

### *Metopiona*, NEW GENUS

*Type species*. — *Metopiona sheari*, new species.

*Diagnosis*. — Small caseyids (8 mm) characterized by short 2nd and 3rd legs of males; anterior gonopods without sternal process and telopodite; flagellocoxite divided into two long movable styles, without filiform flagella.

*Description*. — Head with epicranial suture inconspicuous; ocellaria with rows of 5, 4 and 2 ocelli, respectively; mandibular stipes not modified.

Collum narrower than head, longer than segment two, anterior margin curved. Pleurotergite 2 with margin long, straight; that of 3rd pleurotergite short, rounded; that of 4th extending below latter, margin finely serrate. Succeeding pleuroterga with long, broadly rounded margins. Ventral striae beginning on segment 2, extending to level of 3rd seta on segment 4.

Leg 1 normal for family. Leg 2 short,  $\frac{2}{3}$  as long as 1st leg; gonapophysis  $\frac{1}{4}$  as long as telopodite, curving cephalad. Leg 3 coxa long, distally broad and flattened with tuft of uncinata apical setae; telopodite short, articulating near midlength of coxa, prefemur large, subequal to that of 2nd leg. Legs 4–7 normal for family.

Anterior gonopod sternum relatively narrow, sternal process absent. Colpocoxite long and relatively narrow, laterally flattened, with vertical groove on lateral side. Flagellocoxite with large, rounded basal sclerite giving rise to slender pedicel divided into two slender styles. Telopodite absent.

Posterior gonopod sternum broadly triangular. Coxa moderately large, endite long, narrow, and curving laterad. Telopodite oblong, constricted, without marginal rim. Leg 10 coxa with large anterior eversible vesicle and slender mesal process.

*Distribution*. — Washington County, Oregon.

*Species*. — One.

*Remarks*. — The flagellocoxite of *Metopiona* is radically different from that of *Opiona*. Instead of numerous flagella there are two acicular styles on an elongate

pedicel. The anterior style is free, and the caudoventral one rests in a groove on the colpocoxite. The pedicel fits into a socket and can rotate from vertical to horizontal; as it does, the caudoventral style (vs, Fig. 99) moves up and down in the groove, and the anterior style moves in an arc at right angles to the pedicel.

***Metopiona sheari*, NEW SPECIES**  
(Figs. 96–99)

*Type specimens.*—Male holotype (AMNH) and one male paratype (WAS) collected by D. R. Malcolm, 21 January 1968, on Bishop Rd. 2 mi N Helvetia, Washington Co., OR.

*Diagnosis.*—With the characters of the genus.

*Male holotype.*—Relative proportions of antennomeres 0.4, 0.9, 1.6, 1.0, 1.7, 1.0, 0.8.

Collum l/w ratio 60%. Body length 8 mm.

Pregonopodal legs of males as described for genus.

Anterior gonopod (Figs. 96, 98, 99) sternum narrow, without lateral process. Colpocoxite relatively long, upright, narrow basally, expanding slightly near midlength, narrowing and tapering distad, with lateral groove to accommodate caudoventral style of flagellocoxite, groove open for most of length, partly covered distad by fold of colpocoxite stem. Flagellocoxite with rounded basal sclerite giving rise to narrow pedicel, broadening distad into node then divided into two unequal, styles, caudoventral style acicular, continuous with axis of pedicel, resting in groove on lateral surface of colpocoxite, anterior style shorter and broader, spiniform, free, directed at right angle to pedicel. Telopodite absent.

Posterior gonopod (Fig. 97) sternum extending to midlength of coxa. Coxal endite acicular, extending slightly beyond tip of telopodite. Latter oblong, narrowing distad, with constriction proximal to midlength, directed obliquely.

*Distribution.*—Known only from the type locality.

*Remarks.*—The material of *M. sheari* was obtained from a berlesate of mixed deciduous and conifer duff. The autapomorphic modification of the flagellocoxite combined with the absence of the sternal process and telopodite justify separate generic status.

**Genus *Caseya* Cook and Collins**

*Caseya* Cook and Collins, 1895:84; Chamberlin and Hoffman, 1958:87; Buckett, 1964:13; Jeekel, 1971:59; Hoffman, 1979:138; Kevan, 1983:2967.

*Placerna* Chamberlin, 1941b:10; Chamberlin and Hoffman, 1958:88; Buckett, 1964:14; Jeekel, 1971:76.

*Zantona* Chamberlin, 1941b:11; Chamberlin and Hoffman, 1958:89; Jeekel, 1971:85; Hoffman, 1979:138; Kevan, 1983:2968. NEW SYNONYMY.

*Type species.*—Of *Caseya*, *C. heteropus* Cook and Collins, 1895, by original designation; of *Placerna*, *P. dorada* Chamberlin, 1941b, by original designation; of *Zantona*, *Z. douglasia* Chamberlin, 1941b, by original designation.

*Notes on synonymy.*—*Placerna* and *Zantona*, proposed by Chamberlin (1941b), were distinguished from *Caseya* by the blunt tarsi of the 2nd and 3rd legs of the male and by the “great reduction in size of the 2nd and 3rd legs of the male,” respectively. However, blunt tarsi as described for *P. dorada* are found in several

species of *Caseya*, and examination of the holotype of *Z. douglasia* reveals legs typical for *Caseya*. The other characters Chamberlin (1941b) mentioned are insignificant, and these names are synonyms of *Caseya*.

*Diagnosis.*—Moderate to large caseyids (9–20 mm) without mandibular modifications characterized by large, complex coxa of leg 7 in males; flagellocoxite developed into pair of long flagella curving within flagellar carina and/or colpocoxite; and presence of two additional coxites, the lateral and mesal laminae.

*Color.*—Head and antennae brown; dorsum and sides usually variably brown, occasionally yellowish, occasionally with yellowish middorsal stripe, areas around dorsal setae and striae depigmented; venter pale or mottled brown; legs light brown.

*Description.*—Head lightly pilose or with sparse facial setae; epicranial suture distinct, ending between antennae; ocellaria with 4–6 rows of from 18 to 26 ocelli; mandibular stipes not modified.

Collum narrower than head, longer than segment 2, l/w ratio ranging from 49 to 67%; anterior margin broadly curved, with raised rim on anterior and lateral margins; striae absent. Pleurotergite 2 extending ventrad below collum, ventral margins rounded. Pleurotergite 3 extending ventrad to variable lengths, usually terminating above levels of those of segments 2 and 4, ventral margins rounded, truncate, or concave. Margins of 4th pleurotergite variably rounded, truncate, subacuminate, or indented to concave. Striae distinct on anterior segments, fading caudally; number increasing caudad from about four on 2nd pleurotergite, extending nearly to middorsum in midbody region.

Pregonopodal legs of males: Leg 1 normal for family, tarsus bearing distinct mesal comb. Leg 2 with coxa recessed in body cavity, telopodite slightly shorter than leg 1. Gonapophysis highly variable, relatively narrow to broad, short and barely exceeding length of adjacent coxae to long and extending to level of femur; straight, curved, uncinata, or bisinuate; apically acute or rounded, with or without ventral setae. Leg 3 coxa large, extending beyond telopodite articulation as variably conical or rounded lobe, length varying from short and terminating below level of prefemur to long and extending beyond distal extremity of femur, lobe with or without tuft of apical setae. Coxae of legs 4–6 either without modifications or with rounded to padlike swellings. Telopodite usually normal for family, occasionally slightly shorter. Leg 7 coxa very large, caudal surface variably concave, with two to four variable distal processes or lobes; telopodite slightly shorter than that of leg 6, but length normal for family.

Anterior gonopods large, partly exposed in situ, orientation varying from nearly erect to caudally prostrate. Sternum broad, well sclerotized, anterior surface often with impression, without processes. Coxa developed into four coxites as follows: colpocoxite largest, extending generally caudoventrad, straight or slightly curved, with broad, variable arms on both sides (lateral and mesal rami), curving distal to rami, with or without basal carina covering flagella and protruding anteriorly. Flagellocoxite consisting of basal sclerite caudal to colpocoxite giving rise to a long, narrow flagellum from anterior surface, latter curving dorsad, cephalad, and caudad, between colpocoxites, distal extremity resting on flange (guide) on intermediate septum of telopodite, terminating near ventral extremity of telopodite. Lateral lamina (ll, Fig. 111) covering flagellar base laterad, broad basally, divided into pair of elongate branches of variable lengths. Mesal lamina (ml, Fig. 111)



located on mesal side of colpocoxite, with broad basal piece and variable distal branches, usually wider than lateral lamina. Telopodite large, configuration variable, extending ventrad then curving cephalad and expanding into thin distal lamina (intermediate septum, si, Fig. 117), curving cephalodorsad adjacent to caudal margin of colpocoxite, with pair of ventral flanges (flagellar guides, fg, Fig. 117) supporting distal extremities of flagella.

Posterior gonopod sternum broad, projecting slightly centrally, extending beyond lateral margins of coxae and curving ventrad. Coxa large, with mesal glandular pore, endite configuration variable, usually extending to or beyond ventral margin of telopodite. Latter petiolate, distally subovoid, outer surface flattened, often with submarginal rim ventrad. Leg 10 coxa large, bearing ventral eversible vesicle and variably cylindrical, truncate, or elongate mesocaudal process, with or without additional projections.

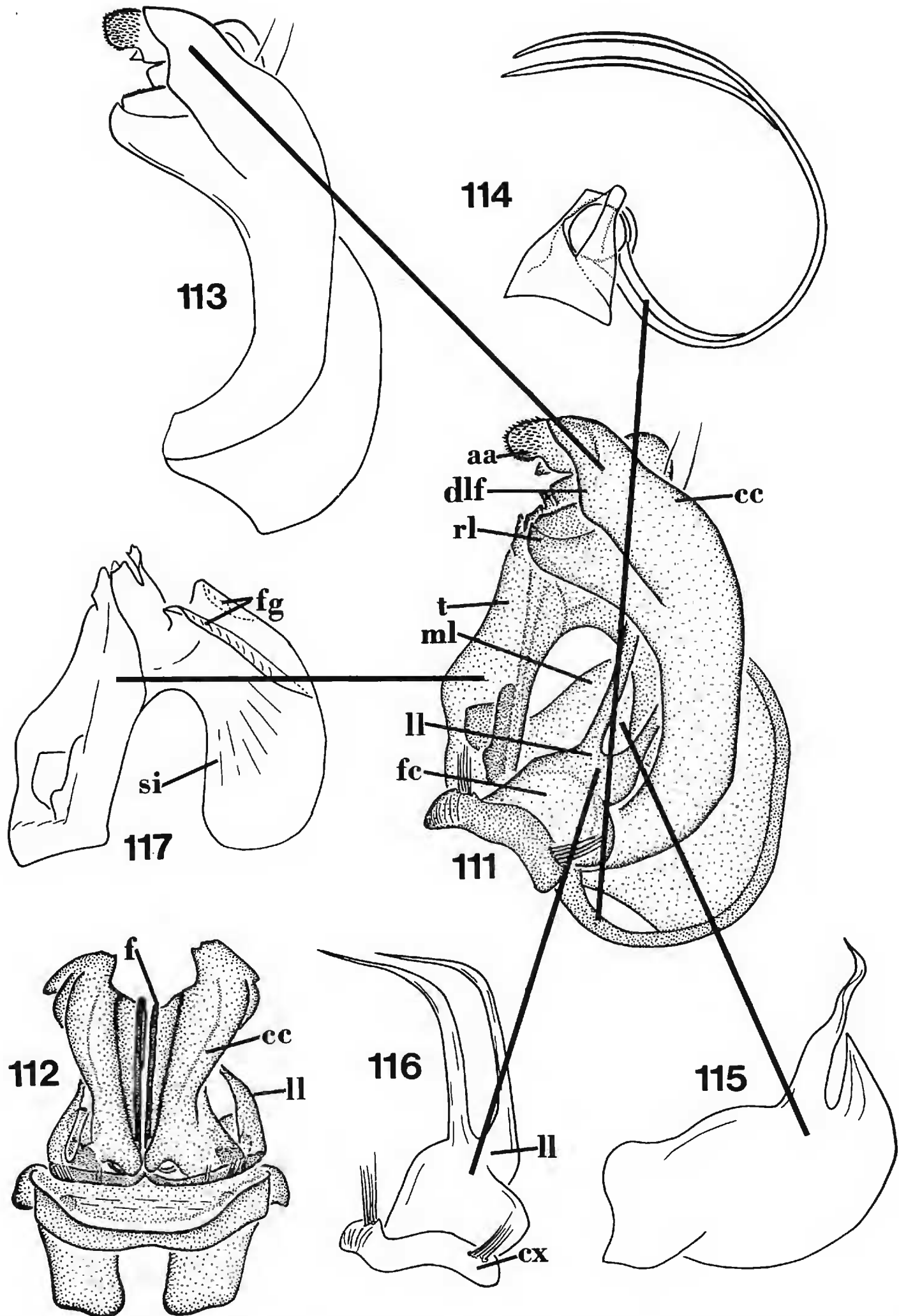
Female cyphopods with valves separate anteriorly, fused posteriorly, subequal or unequal with either valve larger, with variable caudal projections. Receptacle normal for family. Postgenital plate absent.

*Distribution.*—Along the Pacific Coast of the United States from Los Angeles to the Puget Sound region of Washington, extending inland up the western slopes of the Sierra Nevada and Cascade Mountain ranges.

*Species.*—Twenty-one are known; more are expected in poorly sampled areas in the range.

*Remarks.*—The complex anterior gonopods in *Caseya* are comprised of a sternum and five distal elements, four coxites plus the telopodite. To facilitate understanding, Figures 111 and 112 show the complete structure of *C. heteropa disjuncta* in lateral and cephalic views, respectively, and Figures 113–117 depict lateral views of the separate components.

The sternum is broad and is fused laterally, and in some species mesally, to the coxal plate. A sternal process is absent. The ovoid coxal plates (cx, Fig. 116), from which the coxites arise, are fused anteriorly. The coxites consist of the lateral and mesal laminae, autapomorphic for *Caseya*, plus the colpocoxite and flagellocoxite. The basal portion of the lateral lamina (ll, Figs. 111, 116) obscures the base of the flagellocoxite in lateral view and is divided into two subsimilar distal branches. The mesal lamina (ml, Figs. 111, 115) is situated opposite the lateral lamina on the mesal side of the gonopod. It too consists of a broad basal piece and two usually dissimilar distal branches; however its configuration in *C. coxalis* is identical to that of the lateral lamina. In most congeners the basal part of the mesal lamina is much broader than that of its lateral counterpart, and the distal branches are shorter and broader. The configuration of the colpocoxite (cc, Figs. 111, 113), the largest and dominant gonopodal component, is of prime taxonomic importance. It attaches anteriorly to the coxal plate, curves variably caudad, and has broad, caudally directed projections on the lateral and mesal sides, the lateral (rl, Fig. 111) and mesal rami. The configuration of the colpocoxite distal to the rami is of particular diagnostic value, and for identification purposes, we designate this section the apical arm (aa, Fig. 111). Situated centrally and shielded by the other coxites is the flagellocoxite (fc, Figs. 111, 114), comprised of an irregular basal sclerite giving rise to two long, paired flagella, which curve cephalad, lie in a groove in the colpocoxite, and are supported by flanges or flagellar “guides” on the intermediate septum of the telopodite. The latter (t, Figs. 111, 117) occupies



Figures 111–117. *Caseya heteropa disjuncta*, left anterior gonopod and parts, Sonoma Co., CA. 111. Gonopod, lateral aspect. 112. The same, anteroventral aspect. 113. Colpocoxite, lateral aspect. 114. Flagellocoxite, lateral aspect. 115. Mesal lamina, lateral aspect. 116. Coxal plate and lateral lamina, lateral aspect. 117. Telopodite, lateral aspect.

the breadth of the gonopod caudally, extends ventrad, then narrows and expands cephalad into a thin lamina, the intermediate septum (si, Fig. 117). On the ventral margin of the latter are the flanges or flagellar "guides" (fg, Fig. 117) which support the distal extremities of the flagella.

The cyphopods of females are situated lateral to leg 2 on segment 3 (Fig. 198). The median groove between the cyphopod valves runs caudad from the receptacle into a recessed pouch then to a circular opening, the oviduct pore (o, Fig. 200), between the distal ends of the valves. In posterior aspect the seminal receptacle is visible through the cyphopod wall. The sternum of segment 4 is produced slightly ventrad between the 3rd legs (Fig. 199), and the lateral surface of the coxa is indented.

KEY TO SPECIES AND SUBSPECIES OF *CASEYA*  
(based primarily on male characters)

1. 4th pleurotergite extending below that of segment 3, ventral margins concave (Fig. 133); gonapophysis relatively long, often exceeding femur, apex rounded or unciniate (Figs. 140, 141) ..... 2
  - 4th pleurotergite marginally truncate, rounded, or narrowly acute (Fig. 155); gonapophysis usually short, curving sharply cephalad (Fig. 153) ..... 11
2. Legs 2-3 with tarsal claws well developed ..... 3
  - Legs 2-3 with tarsal claws reduced or absent (Figs. 128, 140) ..... 4
3. Pleurotergite 2 shorter than that of segment 3; leg 7 coxa with long, slender process; anterior gonopods as in Fig. 122; Santa Cruz and San Mateo cos., CA ..... *coxalis* Loomis
  - Pleurotergites 2-3 subequal; leg 7 coxa without process; gonopods as in Fig. 121; Shasta Co., CA ..... *shastensis*, new species
4. Coxa of leg 7 without long, slender, cylindrical process ..... 5
  - Coxa of leg 7 with a long, slender, cylindrical process, usually extending beyond level of prefemur ..... 7
5. Leg 7 coxa at least three times as wide as telopodite in lateral aspect, with small mesal process; telopodites of posterior gonopods without marginal rims ..... 6
  - Leg 7 coxal width subequal to that of telopodite in lateral aspect, with mesal coxal prominence bearing three small processes; telopodites of posterior gonopods with marginal rims; anterior gonopods in Fig. 134; Calaveras to Nevada cos., CA ..... *dorada* (Chamberlin)
6. Anterior gonopods as in Fig. 118; Douglas, Jackson, and Curry cos., OR ..... *douglasia* (Chamberlin)
  - Anterior gonopods as in Fig. 120; Jackson and Josephine cos., OR ..... *bryophila*, new species
7. Leg 7 coxal process setiferous, not sclerotized ..... 8
  - Leg 7 coxal process slender, sclerotized, and cylindrical ..... 9
8. Anterior gonopods as in Fig. 136; Fresno and Madera cos., CA ..... *taliae*, new species
  - Anterior gonopods as in Fig. 135; Stanislaus Co., CA ..... *occidentalis*, new species

9. Body with broad, yellow or tan middorsal longitudinal stripe; anterior gonopods without lateral ramus, lateral lamina without accessory process (Fig. 119); Thurston to Jefferson cos., WA . . . *borealis*, new species  
 Body without middorsal stripe; lateral lamina of anterior gonopods with basal accessory process . . . . . 10
10. Coxa of leg 7 with two processes; accessory process of anterior gonopod broad, margin jagged (Fig. 138); Fresno to Mariposa cos. CA . . . . .  
 . . . . . *prionota*, new species  
 Coxa of leg 7 with three processes; accessory process of anterior gonopod slender (Fig. 137); Tulare Co., CA . . . . . *sequoia* Chamberlin
11. Margin of 4th pleurotergite narrowly acute (Fig. 155) . . . . . 12  
 Margin of 4th pleurotergite broadly rounded . . . . . 14
12. Gonapophysis curved sharply cephalad; body with distinct, yellow middorsal stripe; anterior gonopods as in Fig. 152; Douglas to Lane cos., OR . . . . . *subtilis*, new species  
 Gonapophysis erect; body without stripe . . . . . 13
13. Anterior gonopods as in Fig. 151; Curry to Lane cos., OR . . . . .  
 . . . . . *dendrogona*, new species  
 Anterior gonopods as in Fig. 148; Coos Co., OR . . . *benedictae*, new species
14. Flagellar carina incomplete, leaving basal gap at least twice as wide as flagellum (Fig. 163) . . . . . 15  
 Flagellar carina complete or with only very narrow basal gap (Figs. 161, 166) . . . . . 18
15. Flagella closely parallel, exposed by incomplete carina (Fig. 163); body with strong middorsal yellow stripe, mottled yellow laterad; Humboldt Co., CA, to Curry Co., OR . . . . . *guttata*, new species  
 Flagella not parallel, one exposed basally and other completely covered by flagellar carina (Fig. 158); body without middorsal stripe . . . . . 16
16. Mesal flagellum extending dorsad into broad arc, flagellar carina extending proximad as long sheath (Fig. 157); Tehama and Shasta cos., CA . . . . .  
 . . . . . *bucketti*, new species  
 Without these characters . . . . . 17
17. Apical arm long, extending well beyond level of telopodite; lateral ramus straight (Fig. 165); pleurotergite 4 with sharply angled caudal excavation; Trinity Co., CA . . . . . *longiloba*, new species  
 Apical arm extending slightly beyond level of telopodite; lateral ramus curving ventrad (Fig. 158); Jackson to Lincoln cos., OR . . . . .  
 . . . . . *westcotti*, new species
18. Posterior gonopod telopodite without defined submarginal rim . . . . . 19  
 Posterior gonopod telopodite with distinct submarginal rim nearly circumscribing entire margin . . . . . 20
19. Anterior gonopods as in Fig. 166; Mariposa Co., CA . . . . .  
 . . . . . *paradoxa*, new species  
 Anterior gonopods as in Fig. 214; Kern and Los Angeles cos., CA . . . . .  
 . . . . . *similis* Causey
20. With well-defined, yellow, middorsal stripe; coxa 7 with elongate conical process extending to distal extremity of prefemur; anterior gonopods as in Fig. 161; Benton to Tillamook cos., OR . . . *megasoma*, new species

- Without well-defined stripe; coxa 7 with short, subcylindrical process, terminating well below distal extremity of prefemur; anterior gonopods otherwise; Monterey and Mariposa to Humboldt and Butte cos., CA  
 ..... *heteropa* Cook and Collins . . . 21
21. Colopocoxite with two to eight distal carinae on distolateral flange; latter concealing base of apical arm (Fig. 172); Monterey to Sonoma cos., CA  
 ..... *h. heteropa* Cook and Collins  
 Without this character . . . . . 22
22. Distolateral flange short, apical arm elongate, almost entirely exposed (Figs. 173, 174); Napa to Mendocino cos., CA . . . . .  
 ..... *heteropa disjuncta*, new subspecies  
 Distolateral flange well developed; apical arm not lengthened . . . . . 23
23. Distolateral flange fused to apical arm; spicules extending over distal part of colpocoxite (Figs. 179, 182, 183); Mariposa to Butte cos., CA . . . . .  
 ..... *heteropa montana*, new subspecies  
 Distolateral flange not fused to apical arm; latter apically spiculate (Fig. 177); Mendocino and Humboldt cos., CA . . . . .  
 ..... *heteropa oraria*, new subspecies

***Caseya douglasia* (Chamberlin), NEW COMBINATION**

(Figs. 118, 123, 124, 184)

*Zantona douglasia* Chamberlin, 1941b:11, figs. 22–24.

*Zantona douglasi*: Chamberlin and Hoffman 1958:89; Kevan, 1983:2968.

*Type specimens*.—Male holotype and female allotype (NMNH) collected by J. C. Chamberlin, 18 November 1939, probably along Days Creek near town of this name, Douglas Co., OR. Chamberlin (1941b) and Chamberlin and Hoffman (1958) cite John Day Creek as the type locality, but there is no stream by this name in Douglas County. The John Day River drains north-central Oregon, emptying into the Columbia River, but *C. douglasia* is absent from this part of the state.

*Diagnosis*.—Characterized by spatulate lateral ramus, cupulate mesal ramus, and by apically upright, rounded colpocoxite, not produced caudad.

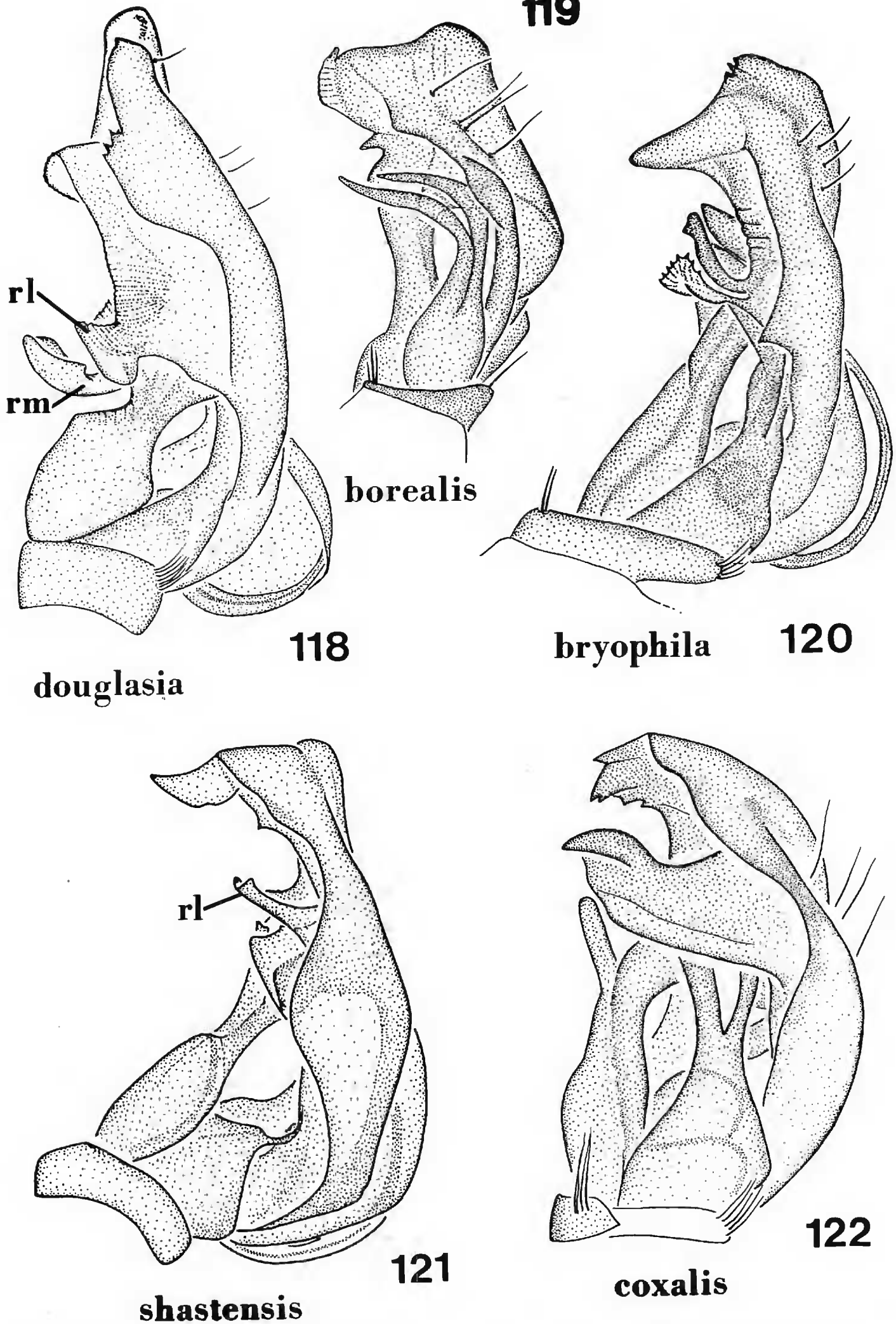
*Color*.—Dorsum dark brown; venter mottled brown.

*Holotype*.—Head lightly pilose. Ocellaria with rows of 7, 6, 4, 3 and 3 ocelli, respectively. Relative proportions of antennomeres 0.3, 1.5, 2.5, 1.4, 2.0, 1.0, 0.4.

Collum l/w ratio 65%. Pleurotergite 3 with margins rounded; margin of 4th pleurotergite indented (Fig. 124), extending below segment 3. Body length 15 mm.

Gonapophysis relatively broad, extending to level of femur, apically rounded with tuft of ventral setae. Leg 3 coxal lobe rounded, length subequal to that of prefemur and femur. Leg 7 coxa with large, conical mesal, and short, truncate cephalic processes.

Anterior gonopod colpocoxite (Fig. 118) upright, apical arm with rounded mesal and smaller, acute lateral lobes, lateral margin with about four acute subapical teeth; lateral ramus (rl, Fig. 118) arising from broad lamina, short and spatulate; mesal ramus (rm) longer, extending beyond lateral ramus and visible in lateral view, cupulate; flagellar carina with basal gap exposing flagella. Flagella nearly parallel, enclosed by carina at midlength. Lateral lamina narrow basally, angling



Figures 118–122. *Caseya* spp., left anterior gonopods, lateral aspects. 118. *C. douglasia* holotype. 119. *C. borealis* paratype, Leeds Loop, Mason Co., WA. 120. *C. bryophila* holotype. 121. *C. shastensis* paratype. 122. *C. coxalis*, Ben Lomond, Santa Cruz Co., CA.

toward colpocoxite stem and terminating near midlength of latter, branches obscured by lateral ramus. Mesal lamina angling toward colpocoxite stem, branches diverging, anterior branch short straight, caudal branch curving caudad, terminating near distal extremity of telopodite. Telopodite short and broad, narrowing abruptly distad, with slender distal process and small intermediate septum.

Posterior gonopod coxal endite (Fig. 123) with densely spiculate anterior knob and longer, acuminate posterior process. Telopodite without marginal rim or sulcus. Leg 10 coxa large, swollen laterad, with narrow, cylindrical, distomesal process.

*Female*.—Cyphod valves subequal, lateral one truncate, caudal corner acute, surface with minute setae (Fig. 184).

*Distribution*.—The southwestern corner of Oregon. The following specimens, all collected by E. M. Benedict and deposited in Dr. Shear's collection (WAS), were examined in addition to the holotype:

OREGON: *Douglas Co.*, 2 mi SE Days Creek, M, 2 F, 6 Nov 1971; Milo, M, 6 Nov 1971; 0.5 mi E, 3 mi SE Tiller, M, 2 F, 6 Nov 1971; 0.5 mi S, 1 mi E Steamboat, F, 30 Oct 1971; Mack Brown Park on Umpqua R., M, 7 Feb 1972; 2 mi N Melrose, M, 7 Feb 1972. *Jackson Co.*, 1 mi S Ruch, M, 13 Nov 1971; 6 mi S Ruch, M, 4 F, 13 Nov 1971; 10 mi E, 6 mi N Gold Hill, M, 4 F, 22 Jan 1972; 10 mi NW Central Pt. on OR hwy. 234, M, 13 F, 22 Jan 1972; 2 mi N, 6 mi E Ashland, 2 M, 7 F, 27 Dec 1971. *Curry Co.*, 14 mi E Gold Beach, M, F, 10 Mar 1972.

*Remarks*.—The original specific name, *douglasia*, agrees in gender with *Caseya*; there is no reason to drop the last letter as done by subsequent authors.

***Caseya borealis*, NEW SPECIES**  
(Figs. 119, 125, 186)

*Type specimens*.—Male holotype (AMNH), three males, one female, and 10 juvenile paratypes (WAS) collected by EMB, 25 November 1967, 4 mi N Shelton, Mason Co., WA. Other paratypes as follows, all from Washington by EMB (WAS): *Mason Co.*, Kamilche Point, 3 M, 6 juvs., 25 Nov 1967; Agate, M, 3 juvs., 25 Nov 1967; 1.5 mi S, 5 mi W Grapeview, 4 M, F, 21 Jan 1968. *Thurston Co.*, Puget, M, 5, 28 Oct 1967.

*Diagnosis*.—Characterized by absence of lateral ramus; long, curved mesal ramus; and by distal configuration of colpocoxite, expanded, extending caudad, and rounded mesally.

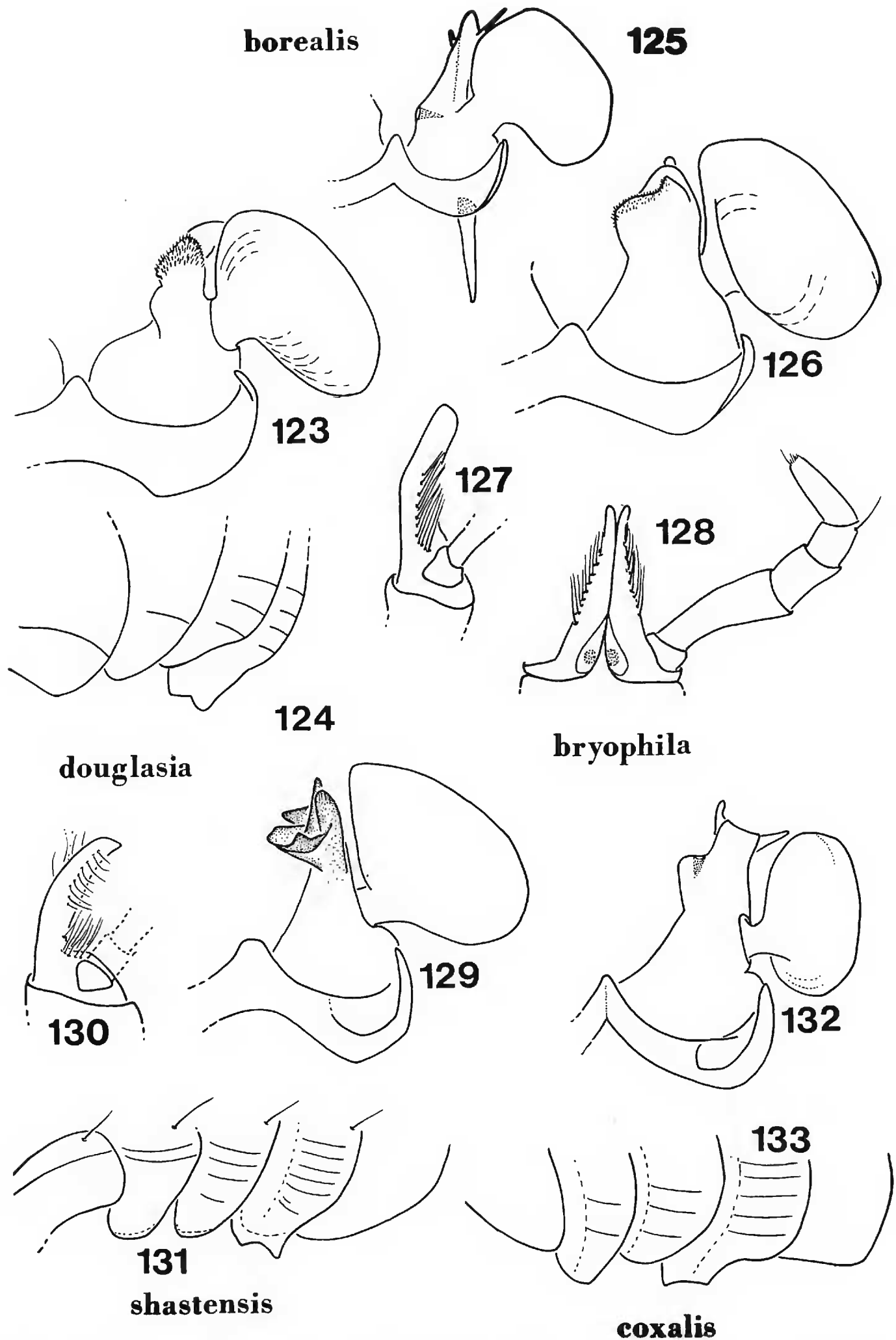
*Color*.—Dorsum with depigmented longitudinal stripe extending from segment 2 through epiproct.

*Holotype*.—Head lightly pilose. Ocellaria with rows of 7, 6, 5, 4 and 2 ocelli, respectively. Relative proportions of antennomeres 0.3, 1.2, 2.3, 1.2, 1.8, 1.0, 0.7.

Collum l/w ratio 60%. Pleurotergite with margins broadly rounded; 4th pleurotergite extending below segment 3, margin concave. Body length 10 mm.

Gonapophysis broad, extending to level of femur, apex rounded with tuft of ventral setae. Leg 3 coxal lobe rounded, extending beyond distal extremity of femur. Coxae of legs 4–6 with rounded swellings. Leg 7 coxa with cylindrical, acuminate basal process, short, stout mesal process, and distolateral lobe.

Anterior gonopod colpocoxite (Fig. 119) with apical arm expanding distad and



Figures 123–133. *Caseya* spp. males. 123, 124. *C. douglasia*. 123. Right posterior gonopod of holotype, anterior aspect. 124. Pleurotergites 1–4 of paratype from Milo, Douglas Co., OR, lateral aspect. 125. Right posterior gonopod of *C. borealis* paratype from Leeds Loop, Mason Co., WA, anterior aspect. 126–128. *C. bryophila*. 126. Right posterior gonopod of holotype, anterior aspect. 127. Right gonapophysis of paratype from French Gulch, Jackson Co., OR, lateral aspect. 128. Gon-



extending caudad, apically rounded mesad; lateral ramus absent; mesal ramus long, curved; flagellar carina small, complete. Flagella parallel. Lateral lamina broadly rounded basally, branches visible in lateral view, curving strongly caudad at midlength, apically acute. Mesal lamina broad, outer margin paralleling flagellum, ending at tip of latter. Telopodite large, with rounded posterior lobe, narrowing distad; intermediate septum small, ovoid.

Posterior gonopod coxal endite (Fig. 125) with broad mesal lobe and spiniform anterior and posterior process. Telopodite without marginal rim or sulcus. Leg 10 coxa without process.

*Female paratype.* — Cyphopod valves unequal, lateral valve (lv, Fig. 186) much smaller than mesal.

*Distribution.* — South and west of Puget Sound, Washington. The following material was examined in addition to the types:

WASHINGTON: *Thurston Co.*, 15 mi S Olympia on Hwy. 5, M, 28 Oct 1967 EMB (WAS); *Millersylvania State Park*, 2 M, 28 Oct 1967 EMB (WAS).

*Remarks.* — *Caseya borealis* is the northernmost congener and the only one occurring north of the Columbia River.

### *Caseya bryophila*, NEW SPECIES

(Figs. 120, 126–128, 185)

*Type specimens.* — Male holotype (AMNH), two male, and three female paratypes (WAS) collected by EMB, 13 November 1971, 15 mi SW Ruch, Jackson Co., OR. Other paratypes, all from Oregon by EMB (WAS), as follows: *Jackson Co.*, French Gulch, 3 mi N Copper, 5 M, 2 F, 13 Nov 1971. *Josephine Co.*, along US hwy. 199, 0.3 mi S Elk Creek, M, 3 F, 18 Dec 1971.

*Diagnosis.* — Characterized by slender, curved lateral ramus; subequal, apically denticulate mesal ramus; and by distal configuration of colpocoxite, curving and tapering caudad to subacuminate tip.

*Color.* — Dorsum mottled brown.

*Holotype.* — Head lightly pilose. Ocellaria with rows of 7, 6, 5, 4 and 2 ocelli, respectively. Relative proportions of antennomeres 0.2, 1.2, 2.3, 1.3, 1.9, 1.0, 0.7.

Collum l/w ratio 63%. Pleurotergite 3 with margins rounded, anterior corner slightly produced; 4th pleurotergite extending below that of segment 3, corners subacuminate. Body length 14 mm.

Leg 2 tarsus short, cylindrical, claw rudimentary (Fig. 128); gonapophysis moderately long and relatively broad, apically rounded (Figs. 127, 128). Leg 3 coxal lobe rounded, extending to distal level of femur; telopodite shorter than that of 2nd leg. Leg 6 with dense coxal setae. Leg 7 coxa with large, subconical mesocaudal, and small, slender mesal processes.

Anterior gonopod colpocoxite (Fig. 120) with apical arm expanding distad, curving and tapering caudad, apically subacuminate; lateral ramus long, slender,

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apophysis and left leg 2, anterior aspect. 129–131. *C. shastensis* paratype. 129. Right posterior gonopod, anterior aspect. 130. Right gonapophysis, lateral aspect. 131. Pleurotergites 1–5, lateral aspect. 132, 133. *C. coxalis* from Ben Lomond, Santa Cruz Co., CA. 132. Right posterior gonopod, anterior aspect. 133. Pleurotergites 1–5, lateral aspect.

broadly curved; mesal ramus subequal in length, apically broad and denticulate; flagellar carina incomplete basally. Lateral lamina broad basally, with three broad, closely appressed branches. Telopodite with long, sinuate mesal process and large lateral piece expanded into small intermediate septum.

Posterior gonopod coxal endite (Fig. 126) with broad anterior, and wide, short, spiculate caudal lobes. Telopodite without marginal rim. Leg 10 coxa with minute mesocaudal, and large, curved caudal projections.

*Female paratype.*—Cyphopod valves unequal, lateral slightly larger, spiculate; mesal valve extending into long, caudolateral process (Fig. 185).

*Distribution.*—Known only from type and paratype localities.

***Caseya dorada* (Chamberlin), NEW COMBINATION**  
(Figs. 134, 139–142, 195)

*Placerna dorada* Chamberlin, 1941b:10, figs. 19–21; Chamberlin and Hoffman, 1958:88; Buckett, 1964:14.

*Type specimen.*—Male holotype and female allotype (NMNH) collected by S. and D. Mulaik, 28 March 1941, 9 mi N Placerville, El Dorado Co., CA.

*Diagnosis.*—Characterized by short, subequal mesal and lateral rami; by distal configuration of colpocoxite, bent sharply caudad, narrowing then expanding apically; and by numerous processes on anterior gonopod telopodite.

*Color.*—Dorsum brown becoming mottled ventrad.

*Description* (composite of holotype and other males).—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 3 and 1 ocelli, respectively. Relative proportions of antennomeres 0.2, 1.2, 2.3, 1.2, 1.6, 1.0, 0.7.

Collum l/w ratio 64%. Pleurotergite 3 with margin rounded; 4th pleurotergite with margin indented (Fig. 139). Body length 10–11 mm.

Gonapophysis slender, distally bisinuate, extending to level of femur, apically acuminate (Figs. 140, 141). Leg 3 coxal lobe extending to level of prefemur, mesal margin straight, lateral margin evenly curved. Leg 7 coxa with a short rounded mesal protuberance, small caudal knob, and two mesal, conical processes, one adjacent to telopodite base.

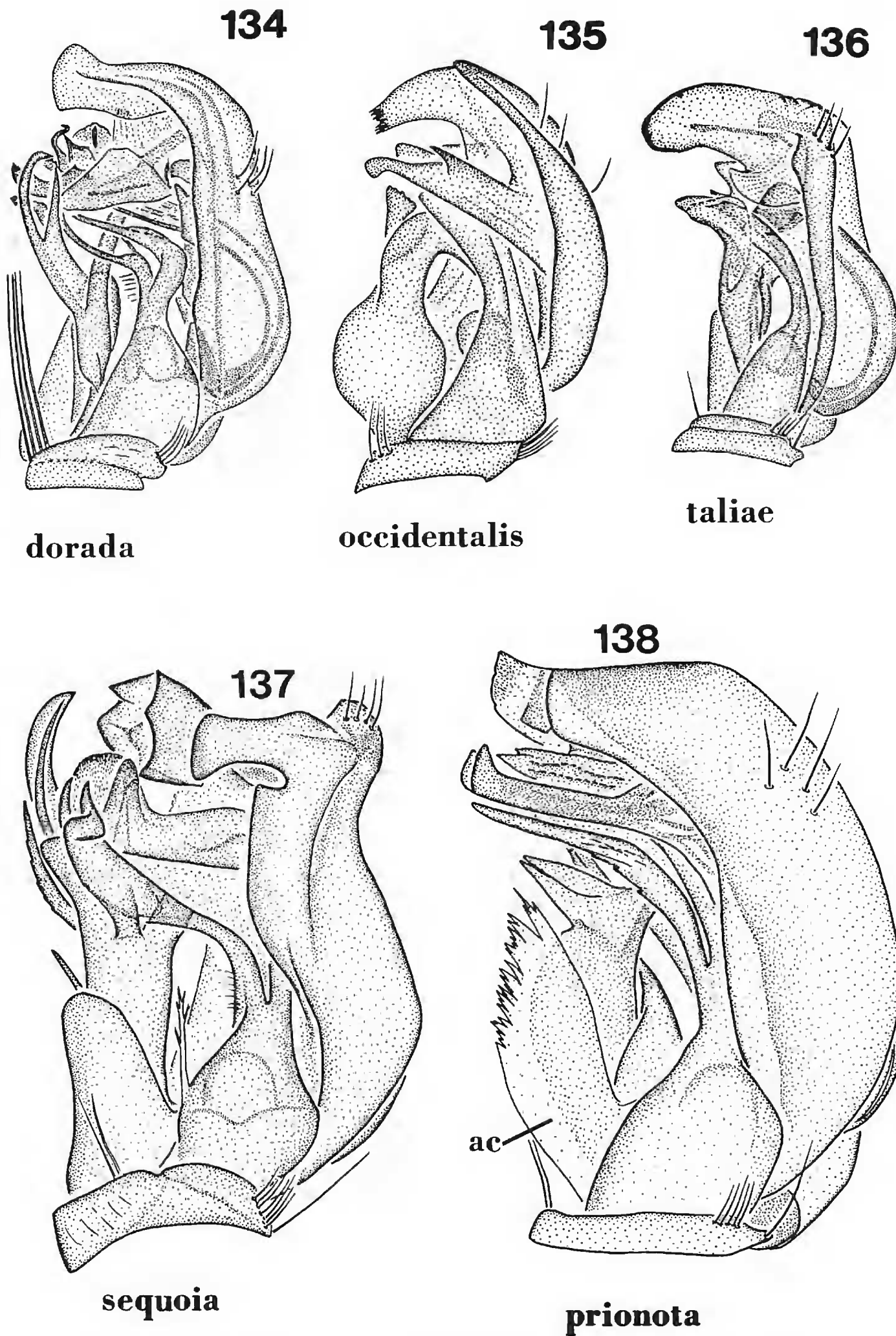
Anterior gonopod colpocoxite (Fig. 134) with apical arm bent sharply caudad, narrowing then expanding to broadly rounded tip; rami small, subequal, truncate; flagellar carina complete. Flagella not parallel. Lateral lamina subglobose basally, divided into two slightly separated branches visible in lateral view, curling ventrad apically. Telopodite expanding distad into ten variable processes; intermediate septum rudimentary, truncate.

Posterior gonopod coxal endite (Fig. 142) falcate, apically flattened. Telopodite with submarginal ventral sulcus. Leg 10 with robust mesocaudal process.

*Female.*—Cyphopod valves unequal, lateral valve larger, long and slender, with irregular posterior lobe (Fig. 195).

*Distribution.*—San Joaquin Valley and western slope of Sierra Nevada Mountains in central California. The following specimens were examined in addition to the holotype:

CALIFORNIA: *Nevada Co.*, Grass Valley, 2 M, 2 F, 10 Feb 1968 (UCD). *Placer Co.*, 6 mi E Auburn, 2 M, 7 Feb 1971, R. F. Wilkey (UCD); Auburn, M, 12 Mar 1958, L. M. Smith and R. O. Schuster (WAS); 4 mi W Newcastle, M, 15 Apr 1958, R. O. Schuster and L. M. Smith (NMNH). *Sacramento Co.*, 0.25 mi



Figures 134–138. *Caseya* spp., left anterior gonopods, lateral aspects. 134. *C. dorada*, 3 mi E Placerville, El Dorado Co., CA. 135. *C. occidentalis* holotype. 136. *C. taliae* topoparatype. 137. *C. sequoia*, 2 mi N Hospital Rock, Sequoia Nat. Pk., Tulare Co., CA. 138. *C. prionota* holotype.

E Fair Oaks, juv., 1 Jan 1968 (UCD); 1 mi W Folsom Dam, F, 18 Apr 1965 (UCD); G. M. Goethe Park, M, 8 Jan 1971, R. Chaves (UCD). *El Dorado Co.*, Folsom Lake, F, 21 Dec 1966 (UCD); Horseshoe Bar, Folsom Lake St. Pk., 2 M, 12 Mar 1958, L. M. Smith and R. O. Schuster (WAS), 3 M, 3 F, 15 Apr 1958, L. M. Smith and R. O. Schuster (NMNH); 3 mi E Placerville, M, F, 19 Jan 1968 (UCD); 3 mi SW Placerville, 2 M, 4 F, 28 Jan 1968 (UCD); 6 mi S El Dorado, 16 M, 23 F, 28 Nov 1964 and 26 Nov 1965 (UCD); Riverton, F, 22 Feb 1958, R. O. Schuster (WAS), 7 F, 19 Feb 1958, R. O. Schuster (NMNH); nr. Nashville, M, 25 Apr 1958, M, 2 F, 5 Mar 1958, L. M. Smith and R. O. Schuster (WAS). *Amador Co.*, 3 mi SSE Jackson, 11 M, 11 F, 27 Dec 1965 (UCD); 4 mi SE Jackson, M, 27 Dec 1965 (UCD). *Calaveras Co.*, 8 mi N Mountain Ranch, 2 M, 19 Jan 1968 (UCD); 1 mi NW Mokelumne Hill, 3 M, 6 F, 27 Dec 1965 (UCD).

*Remarks.*—Chamberlin (1941b) erected *Placerna* for this species, based primarily on the supposedly blunt tarsi 2 and 3. With the spectrum of diversity now known in *Caseya*, separate generic status is unjustified.

Variation was observed in the anterior gonopods and the ventral lamina of pleurotergite 4. In males from Nevada County the apical arm of the colpocoxite is serrate; however those from 3 mi east of Placerville only possess minute teeth; and those from other localities have smooth margins as shown in Figure 134. The margin of the 4th pleurotergite is narrow in specimens from 3 mi SSE of Jackson, Amador Co., and the anterior corner may be much enlarged, curve cephalad, and extend beyond the posterior corner.

*Caseya dorada* is common throughout its range. Dense populations were encountered 6 mi S El Dorado, El Dorado Co., in loose shale covered with deciduous leaf litter. Here the species occurs sympatrically with *C. heteropa montana* but is easily distinguished by its much smaller size.

### *Caseya occidentalis*, NEW SPECIES

(Figs. 135, 144, 194)

*Type specimens.*—Male holotype and one female paratype (UCD) collected by R. F. Wilkey, 14 March 1970, in Del Puerto Canyon, 12 mi W Patterson, Stanislaus Co., CA.

*Diagnosis.*—Characterized by long, apically rounded lateral ramus with mid-length spur; subequal mesal ramus with ventral projection; and by curved apical arm of colpocoxite with finely serrate tip.

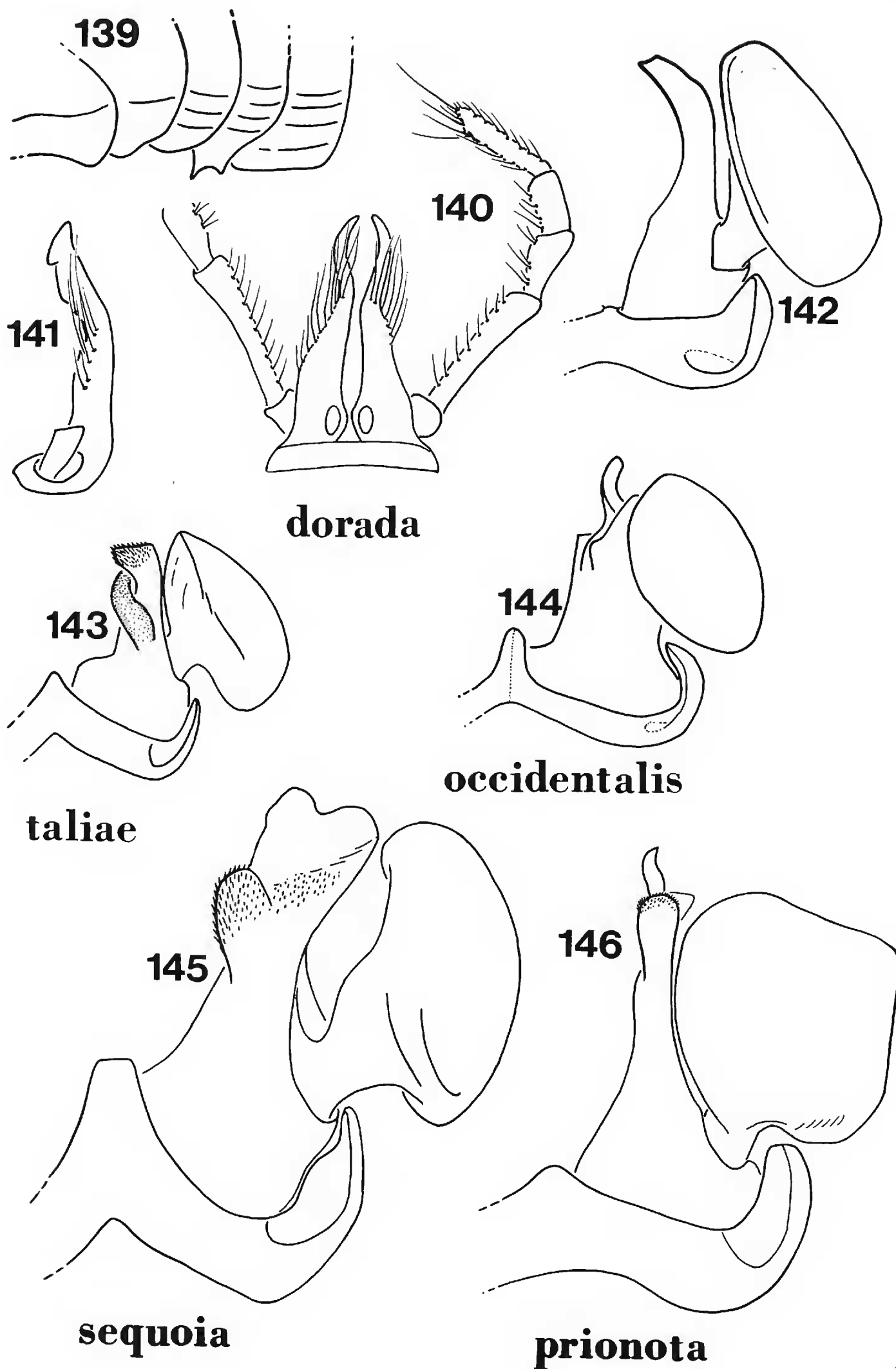
*Color.*—Dorsum brown.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 4, 3 and 1 ocelli, respectively. Relative proportions of antennomeres 0.3, 1.0, 2.3, 1.4, 1.9, 1.0 and 0.7.

Collum l/w ratio 53%. Pleurotergite with margins evenly rounded, terminating above levels of 2nd and 4th pleurotergites; latter with margins concave. Body length 9 mm.

Gonapophysis falcate, extending to level of femur, with long setae along anterior margin. Leg 3 coxal lobe, subconical, extending to distal extremity of femur. Legs 4–6 with rounded coxal swellings. Leg 7 coxa with short, stout anteriomesal process and long, setiferous, subconical, caudal one extending beyond level of prefemur.

Anterior gonopod colpocoxite (Fig. 135) with apical arm curving caudad, tip finely serrate; lateral ramus long, extending beyond tip of latter with spine near midlength, apically rounded; mesal ramus subparallel to latter, of same general



Figures 139–146. *Caseyia* spp. males. 139–142. *C. dorada*, 3 mi E Placerville, El Dorado Co., CA. 139. Pleurotergites 1–5, lateral aspect. 140. Gonapophyses and 2nd legs, anterior aspect. 141. Right gonapophysis, lateral aspect. 142. Right posterior gonopod, anterior aspect. 143–146. *Caseyia* spp., right posterior gonopods, anterior aspects. 143. *C. taliae* topoparatype. 144. *C. occidentalis* holotype. 145. *C. sequoia*, 2 mi N Hospital Rock, Sequoia Nat. Pk., Tulare Co., CA. 146. *C. prionota* holotype.

configuration but with small ventral projection and enlarged apex; flagellar carina complete. Flagella nearly parallel. Lateral lamina large, with two branches curving behind and obscured by lateral ramus in lateral view. Mesal lamina broad, covering much of mesal surface. Telopodite with two mesal processes, long, narrow one branching near midlength, and shorter one near apex; intermediate septum curving slightly dorsad.

Posterior gonopod coxal endite (Fig. 144) irregular, ventral surface with depression, mesal corner extending slightly beyond distal extremity of telopodite. Latter without submarginal rim. Leg 10 coxa with long mesocaudal process.

*Female paratype.* — Cyphopod valves unequal, lateral one extending into rounded caudal lobe (Fig. 194).

*Distribution.* — Known only from the type locality.

***Caseya prionota*, NEW SPECIES**  
(Figs. 138, 146, 197)

*Type specimens.* — Male holotype and 17 female paratypes (UCD) collected by R. O. Schuster, 5 February 1968, 14 mi E Briceburg, Mariposa Co., CA. Other paratypes as follows: *Mariposa Co.*, 1 mi E Briceburg, 7 F, 2 Dec 1967 (UCD). *Fresno Co.*, 7 mi SW Auberry, 3 M, 2 F, 4 Mar 1966, J. Prine (UCD).

*Diagnosis.* — Characterized by linear lateral ramus, usually bent ventrad apically and divided; mesal ramus shorter, apically acute; colpocoxite with apical arm curved distally, broadly rounded; and by large, jagged accessory projection from base of lateral lamina.

*Color.* — Dorsum dark brown.

*Holotype.* — Facial setae sparse. Ocellaria with rows of 7, 6, 5, 3 and 2 ocelli, respectively. Relative proportions of antennomeres 0.3, 1.4, 3.0, 1.5, 2.2, 1.0, 0.6.

Collum l/w ratio 67%. Pleurotergite 3 shorter than those of segments 2 and 4; latter with margin truncate. Body length 12 mm.

Gonapophysis narrow, extending to level of femur, apically uncinuate with lateral setae. Leg 3 coxal lobe tapering distad, extending beyond distal extremity of prefemur; telopodite longer than that of 2nd leg, tarsal claw rudimentary. Leg 7 coxa with subconical caudal lobe, extending to distal extremity of prefemur, and short, truncate, mesal projection.

Anterior gonopod colpocoxite (Fig. 138) with apical arm curving broadly caudad, broadly rounded distally; lateral ramus long, extending beyond tip of colpocoxite, straight for most of length, bent ventrad and bifurcate apically; mesal ramus shorter, apically acute; flagellar carina inconspicuous. Flagella parallel, almost completely enclosed by colpocoxite. Lateral lamina basally broad, with large jagged accessory projection from caudal surface (ac, Fig. 138), branches subequal, curving caudad, terminating near tip of lateral ramus, apically acuminate, margin notched. Mesal lamina wide basally, narrowing and divided into broad anterior plate extending to flagella and long, striated caudal piece. Telopodite with two sharp caudally directed spines and spiculate mesal process arising at midlength, with subtriangular lateral process farther distad; intermediate septum small, ovoid.

Posterior gonopod coxal endite (Fig. 146) with rounded, pilose anterior lobe and prominent ventral process, extending well beyond telopodite, lateral corner

subacuminate. Telopodite without marginal rim or sulcus. Leg 10 coxa with short, broad, mesocaudal process.

*Female paratype.*—Cyphopod valves subequal (Fig. 197), lateral slender, with caudal lobe.

*Distribution.*—Fresno to Mariposa counties, California. The following additional sample was examined.

*Madera Co.*, San Joaquin Exper. Range, M, 15 F, 22 Feb 1953, B. Ward (NMNH).

*Remarks.*—*Caseya prionota* and *sequoia* are the only two congeners with an accessory process on the lateral lamina. Males from Fresno County vary in the configuration of the 4th pleurotergites, the lateral ramus, and the coxal endite. The margin of the 4th pleurotergite has a small anterior notch; the lateral ramus is not apically bent or divided; and the ventral process of the coxal endite is short, not extending beyond the level of the telopodite.

### *Caseya sequoia* Chamberlin

(Figs. 137, 145, 196)

*Caseya sequoia* Chamberlin, 1941b:10, figs. 17–18; Causey, 1952:113; 1955:90; Chamberlin and Hoffman, 1958:87; Buckett, 1964:13.

*Type specimens.* Male holotype, female allotype, and one female and three juvenile paratypes collected by S. and D. Mulaik, 21–22 March 1941, 12 mi NE Hammond, Tulare Co., CA. The gonopods are missing from the holotype, and the following description is prepared from a near topotypical male.

*Diagnosis.*—Characterized by broad lateral ramus, apically divided with broad mesal and subacuminate lateral branches; slender sinuous mesal ramus; colpocoxite with apical arm bent abruptly caudad, divided into short, rounded lateral branch and longer, apically concave mesal branch; lateral lamina with slender, barbed, basal accessory process.

*Color.*—Dorsum brown.

*Male from Sequoia National Park.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 4 and 2 ocelli, respectively. Relative proportions of antennomeres 0.4, 1.0, 2.3, 1.2, 1.7, 1.0, 0.6.

Collum l/w ratio 63%. Pleurotergite 3 shorter than those of segments 2 and 4, margin truncate; margin of 4th pleurotergite indented. Body length 15 mm.

Gonapophysis extending to level of femur, apically uncinata with lateral setae. Leg 3 coxal lobe subovoid, extending beyond distal extremity of femur, with small apical tuft of setae. Legs 4–6 with rounded coxal swellings. Leg 7 coxa with lateral lobe, conical caudal prominence, small, rounded, mesoventral process, and small, anterior knob.

Anterior gonopod colpocoxite (Fig. 137) with apical arm bent abruptly caudad, divided into rounded lateral branch and robust mesal branch, distally expanded and concave; lateral ramus robust, long, extending beyond tip of apical arm, bent ventrad apically and divided, inner branch broadly rounded, outer branch subacuminate; mesal ramus slender, sinuous, and tapered; flagellar carina absent. Flagella parallel, entirely enclosed by colpocoxite. Lateral lamina basally broad, with narrow, barbed accessory process arising from caudal margin; branches widening beyond midlength, twisted, apically acute. Mesal lamina expanded, nearly

covering mesal surface of gonopod, with three lanceolate branches extending beyond bend of telopodite. Telopodite with distolateral bladelike, and serrate mesal projections, apex with ovoid spiculate lamina; intermediate septum elongate and ovoid, flagellar guide only on lateral side.

Posterior gonopod coxal endite (Fig. 145) with rounded, pilose anterior lobe, stem extending to distal margin of telopodite, indented apically. Telopodite without marginal rim or sulcus. Leg 10 coxa with robust mesocaudal process.

*Female holotype.*—Cyphopod valves unequal, mesal valve larger (Fig. 196).

*Distribution.*—Known only from Tulare County, California. The following material was examined in addition to the type specimens:

*Tulare Co.*, Hospital Rock Cpgd., Sequoia Nat. Pk., 2 M, 12 Feb 1967 (UCD), F, 29 June 1946, collector unknown (AMNH).

*Remarks.*—For years we thought the types of *C. sequoia* were lost, since they are not present under this name in the NMNH collection or in its type list. However in April 1988, the second author discovered them under the name "*Termocona*" *sequoia*. Evidently, Chamberlin originally planned to erect the new genus, "*Termocona*," for this species but changed his mind without correcting the label in the type vial. One wonders why he correctly placed *C. sequoia* and opted against "*Termocona*," while erecting the monotypic genera *Placerna* and *Zantona* for other species of *Caseya* in the two succeeding species accounts (Chamberlin, 1941b).

In the original description of *C. sequoia*, Chamberlin (1941b) refers to both a male and a female as the holotype. The type vial appears to contain a dissected male lacking the gonopods and associated legs, one whole female, one dissected female, and three fragmented juveniles. We consider the male to be the holotype, although it has little value without the gonopods.

***Caseya taliae*, NEW SPECIES**  
(Figs. 136, 143, 193)

*Type specimens.*—Male holotype and nine male and three female paratypes (UCD) collected by J. Prine, 31 January 1966, 10 mi NE Auberry, Fresno Co., CA. One male paratype (UCD) collected by M. R. Gardner and T. N. Slay, 18 January 1970, 3.5 mi NE Oakhurst, Madera Co., CA.

*Diagnosis.*—Characterized by short, subacuminate lateral ramus; long, tapered mesal ramus; and broadly rounded, apically spiculate apical arm.

*Color.*—Dorsum brown.

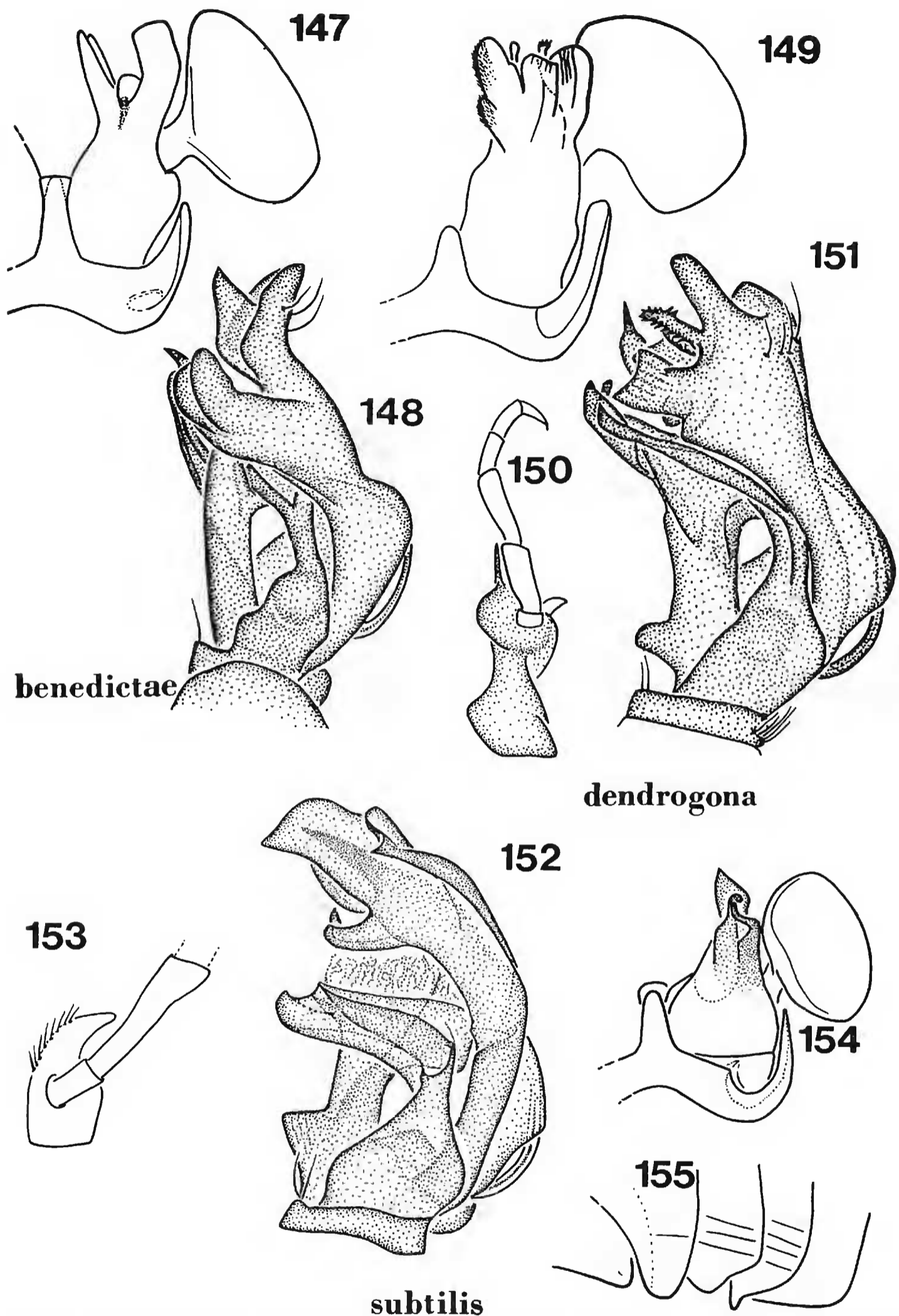
*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 4 and 2 ocelli, respectively; relative proportions of antennomeres 0.2, 1.0, 2.1, 1.1, 1.5, 1.0, 0.6.

Collum l/w ratio 61%. Pleurotergite 3 with margin truncate; 4th pleurotergite margin indented. Body length 9 mm.

Gonapophysis curving slightly cephalad, extending to distal extremity of femur, apically acute. Leg 3 coxal lobe subovoid, extending beyond distal extremity of femur, with tuft of apical setae. Legs 4–6 with padlike coxal swellings. Leg 7 coxa with small anterior knob and two large caudal projections, mesal one triangular, lateral one cylindrical and setiferous.

Anterior gonopod colpocoxite (Fig. 136) with apical arm bent broadly caudad, apically rounded and spiculate; lateral ramus short, subacuminate; mesal ramus longer, tapered; flagellar carina well developed, complete. Flagella not parallel.





Figures 147–155. *Caseya* spp. males. 147, 148. *C. benedictae*, holotype. 147. Right posterior gonopod, anterior aspect. 148. Left anterior gonopod, lateral aspect. 149–151. *C. dendrogona*. 149. Right posterior gonopod of paratype from 7.7 mi SW Cottage Grove, Douglas Co., OR, anterior aspect. 150. The same, left leg 7, lateral aspect. 151. Left anterior gonopod of paratype from Coos Co., OR, lateral aspect. 152–155. *C. subtilis* topoparatype. 152. Left anterior gonopod, lateral aspect. 153. Right gonapophysis, lateral aspect. 154. Right posterior gonopod, anterior aspect. 155. Pleurotergites 1–6, lateral aspect.

Lateral lamina narrow basally, branches curving broadly caudad, apically blunt. Mesal lamina large, divided into broad anterior, and long, sinuous posterior branches. Telopodite with prominent caudal projection; intermediate septum slightly recurved.

Posterior gonopod coxal endite (Fig. 143) shorter than telopodite, with anterior projection curving behind truncate, setose caudal branch. Telopodite with lateral margin curving sharply anteriorly, with ventral and anterior rims. Leg 10 coxa with long cylindrical process.

*Female paratype.* — Cyphopod valves unequal, lateral one larger with irregular caudal projection (Fig. 193).

*Distribution.* — Known only from the type and paratype localities.

### *Caseya shastensis*, NEW SPECIES

(Figs. 121, 129–131, 191)

*Type specimens.* — Male holotype and one male and one female paratypes (UCD) collected by J. S. Buckett and M. R. Gardner, 21 December 1966, 18 mi W Redding, Shasta Co., CA.

*Diagnosis.* — Characterized by short, cupped lateral ramus; short broad mesal ramus; largely upright colpocoxite, narrowing beyond midlength, apical arm bent caudad, distally short and acute; and complex coxal endite of posterior gonopod, with four short projections and laminae.

*Color.* — Dorsum brown.

*Holotype.* — Facial setae sparse. Ocellaria with rows of 7, 6, 5, 4 and 2 ocelli, respectively. Relative proportions of antennomeres 0.4, 1.1, 2.2, 1.2, 1.7, 1.0, 0.6.

Collum l/w ratio 57%. Pleurotergites 2–3 extending to same level, margins of latter broadly rounded; margin of 4th pleurotergite concave (Fig. 131). Body length 14 mm.

Gonapophysis extending to level of femur, with lateral row of setae (Fig. 130). Leg 3 coxa with subtriangular ventral lobe, extending beyond distal margin of prefemur. Legs 4–6 with padlike coxal swellings. Leg 7 coxa with narrow subconical mesal process and low, anterior knob.

Anterior gonopod colpocoxite (Fig. 121) largely upright, narrowing distal to midlength, apical arm expanding and bending caudad, apically acute; lateral ramus short, ventral surface excavated; mesal ramus shorter, wide, leaning laterad; flagellar carina incomplete basally. Flagella parallel. Lateral lamina curving strongly anteriorly, branches short, sinuate, and curving caudad. Mesal lamina broad, divided into narrow dorsal and broad ventral projections. Telopodite with acute distomesal and broad apical processes; intermediate septum small, lateral flagellar guide large, with acute dorsal process, mesal guide small.

Posterior gonopod coxal endite (Fig. 129) with cupped lamina directed anteriorly, two upright central projections, rounded and acuminate, and short, broad caudal lamina. Telopodite without marginal rim or sulcus. Leg 10 coxa with long cylindrical mesocaudal process.

*Female paratype.* — Cyphopod valves subequal, lateral one divided vertically, with rounded caudal lobe (Fig. 191).

*Distribution.* — Known only from the type locality.

***Caseya coxalis* Loomis**  
(Figs. 122, 132, 133, 189, 190)

*Caseya coxalis* Loomis, 1966:225, figs. 5–7.

*Type specimens.*—Male holotype and two male and three female paratypes (NMNH) collected by O. F. Cook, 21 February 1929, at Davenport, Santa Cruz Co., CA. Additional paratypes, all by O. F. Cook (NMNH), as follows: *Santa Cruz Co.*, between Santa Cruz and Holy City, M, 3 F, 2 Jan 1928. *San Mateo Co.*, S of Pescadero, M, F, 21 Feb 1929.

*Diagnosis.*—Characterized by broad, subequal, and nearly identical lateral and mesal rami; and by broadly curved, apically irregular and jagged apical arm.

*Color.*—Dorsum brown, depigmented areas around dorsal setae and lateral striae contiguous on some segments forming irregular middorsal stripe.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 3 and 2 ocelli, respectively. Relative proportions of antennomeres 0.2, 1.1, 1.9, 1.1, 1.8, 1.0, 0.5.

Collum l/w ratio 56%. Pleurotergite 2 extending below segment 3; 4th pleurotergite marginally concave (Fig. 133). Body length 14–16 mm.

Gonapophysis extending to distal extremity of femur, apically uncinat and tapered. Leg 3 coxal lobe subtriangular, extending beyond distal extremity of femur. Leg 7 coxa with cylindrical caudal projection, extending beyond distal extremity of prefemur, and small mesal projection curving laterad distally.

Anterior gonopod colpocoxite (Fig. 122) with apical arm curving broadly caudad, apically irregular and jagged; lateral and mesal rami broad, nearly identical, extending beyond level of tip of apical arm, expanding beyond midlength; flagellar carina complete. Flagella parallel. Lateral lamina basally broad, branches diverging proximally, curving mesocaudad, converging distally. Mesal lamina with paired distal branches. Telopodite with blunt mesal projection, intermediate septum well developed.

Posterior gonopod coxal endite (Fig. 132) broad, mesal and lateral corners produced. Telopodite ovoid, without rim on anterior margin. Leg 10 coxa with short, rounded mesocaudal process.

*Female.*—Cyphopod valves irregular, subequal, lateral one narrow, with or without large caudal lobe (Figs. 189, 190).

*Distribution.*—Santa Cruz and San Mateo counties, California. The following specimens were examined in addition to the types.

*Santa Cruz Co.*, Ben Lomond, 2 M, F, 28–29 Dec 1964 (UCD), F, 22 Jan 1955, D. Burdick and M. Wasbauer (CIS), F, 29 Dec 1966 (UCD); 12 mi N Boulder Cr., M, F, 22 Jan 1955, D. Burdick and M. Wasbauer (CIS); 8 mi N Boulder Cr., M, 2 F, 22 Jan 1955, D. Burdick and W. Wasbauer (CIS); Boulder Cr., M, 3 F, 4 Dec 1958, V. Roth (NMNH).

***Caseya subtilis*, NEW SPECIES**  
(Figs. 152–155, 192)

*Type specimens.*—Male holotype and one male and numerous juvenile paratypes (UCD) collected by J. S. Buckett and M. R. Gardner, 23 March 1968, 7.7 mi SW Cottage Grove, Douglas Co., OR. Additional paratypes as follows: *Douglas*

Co., Island Cpgd., 0.5 mi S, 1 mi E Steamboat, M, 30 Oct 1971, EMB (WAS). Lane Co., Dexter, M, 2 F, Jan 1970, J. S. Buckett (UCD).

*Diagnosis.*—Characterized by short rounded lateral ramus; broad curved mesal ramus; and broadly curved colpocoxite with fold on outer margin, apical arm with inner corner produced, acute.

*Color.*—Dorsum with broad middorsal stripe.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 3 and 1 ocelli, respectively. Relative proportions of antennomeres 0.6, 1.1, 2.3, 1.2, 1.8, 1.0, 0.7.

Collum l/w ratio 58%. Pleurotergite 3 shorter than adjacent segments, margin concave; margin of 4th pleurotergite subacuminate (Fig. 155).

Gonapophysis short, extending to midlength of prefemur, curving sharply cephalad (Fig. 153). Leg 3 coxal lobe subconical, terminating below level of prefemur. Leg 7 coxa with slender cylindrical ventral process, and short, stout mesal process curving laterad. Body length 12 mm.

Anterior gonopod colpocoxite (Fig. 152) curving broadly caudad, outer margin folded, apical arm blunt, inner corner produced and acute; lateral ramus short, apically rounded; mesal ramus short and broad, curving sharply ventrad, apically acute; flagellar carina incomplete. Flagella parallel. Lateral lamina wide basally, narrowing to level of division, lateral branch broad covering narrower mesal branch in lateral view, both curving sharply caudad and tapering to acuminate tips. Mesal lamina wide basally, divided into wide posterior branch, covering most of mesal surface of gonopod, and narrow dorsal branch. Telopodite expanding apically into large, serrate lamina; intermediate septum moderately developed, flagellar guides large.

Posterior gonopod coxal endite (Fig. 154) complex, with two curled anterior, and broad spatulate posterior projections. Telopodite with rim on anterior side. Leg 10 coxa with elongate cylindrical mesocaudal process.

*Female paratype.*—Cyphopod valves unequal, mesal slightly larger with blunt caudal lobe (Fig. 192).

*Distribution.*—Known only from the type and paratype localities.

### *Caseya dendrogona*, NEW SPECIES

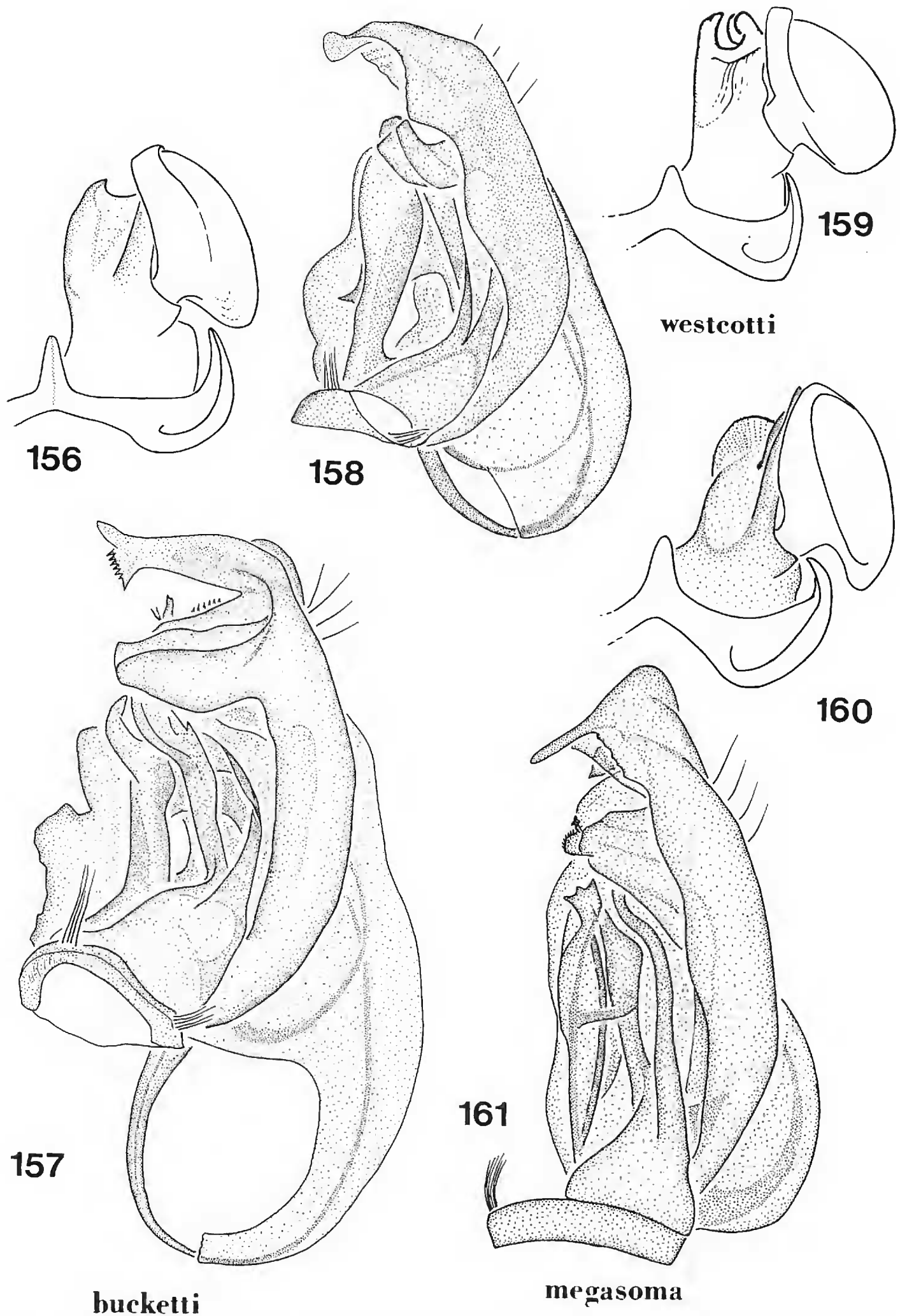
(Figs. 149–151, 187, 188)

*Type specimens.*—Male holotype (AMNH) collected by E. M. Benedict, 16 October 1971, along OR hwy. 242, 5 mi E McKenzie Bridge, Lane Co., OR. Paratypes as follows: Lane Co., 10 mi E Lowell, M, 4 Mar 1972 EMB (WAS); along OR hwy. 126, 2 mi N, 7 mi E McKenzie Bridge, M, F, 28 Feb 1972, EMB (WAS). Douglas Co., 7.7 mi SW Cottage Grove, M, 23 Mar 1968, J. S. Buckett and M. R. Gardner (UCD). Curry Co., 13 mi E Gold Beach, 2 M, F, 10 Mar 1972, EMB (WAS). Coos Co., 6 mi E, 2 mi S, and 11 mi E, 4 mi N Alleghany, 4 M, 2 F, 20 Nov 1971, EMB (WAS).

*Diagnosis.*—Characterized by broad, quadrate, subsimilar lateral and mesal rami; and by distally expanded, divided apical arm, lateral branch subdivided into blunt outer and narrow, spiculate inner projections, mesal branch developed into broad lamina with slender apical process.

*Color.*—Dorsum brown. Color fading laterad.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 5, 5, 4, 3 and 1 ocelli,



Figures 156–161. *Caseya* spp. males. 156, 157. *C. bucketti* paratype, Inwood, Shasta Co., CA. 156. Right posterior gonopod, anterior aspect. 157. Left anterior gonopod, lateral aspect. 158, 159. *C. westcotti*. 158. Left anterior gonopod of paratype from Coos Co., OR, lateral aspect. 159. Right posterior gonopod of holotype, anterior aspect. 160, 161. *C. megasoma*. 160. Right posterior gonopod of holotype, anterior aspect. 161. Left anterior gonopod of paratype from 8 mi SW Philomath, Benton Co., OR, lateral aspect.

respectively. Relative proportions of antennomeres 0.3, 0.7, 2.3, 1.4, 2.0, 1.0, 0.7.

Collum l/w ratio 52%. Pleurotergite 3 shorter than segments 2 and 4, margin rounded; 4th pleurotergite with margin broadly rounded. Body length 13 mm.

Gonapophysis short, apically rounded. Leg 3 coxal lobe small, rounded, terminating below level of prefemur. Coxae of legs 4–6 with padlike ventral swellings. Leg 7 coxa laterally expanded, surrounding telopodite socket (Fig. 150), with slender, cylindrical process extending to distal extremity of prefemur and short, heavy mesal projection.

Anterior gonopod colpocoxite (Fig. 151) angling caudad, greatly expanded distad, apical arm with lateral and mesal branches, former subdivided into blunt distal and narrower, strongly spiculate proximal projections, mesal branch developed into broad caudal lamina, tapering distad with slender apical process; lateral and mesal rami subsimilar, broad, quadrate, extending to level of other lateral projections; flagellar carina incomplete. Flagella parallel. Lateral lamina broad basally, branches bending strongly caudad and extending to level of caudal margin of telopodite, situated on sheath of latter. Telopodite with strong caudal projection, sides curving to form sheath for branches of lateral lamina; intermediate septum well developed, recurved nearly to base.

Posterior gonopod coxal endite (Fig. 149) comprised of three rounded anterior lobes, and two pilose and two narrow caudal processes. Telopodite without marginal rim or sulcus. Leg 10 coxa with robust mesocaudal process.

*Female paratype.* — Cyphopod valves unequal, lateral one smaller, slender, posterior margin irregular; mesal valve longer, with rounded caudal lobe (Figs. 187, 188).

*Distribution.* — Southwestern Oregon from the Pacific Coast to the Cascade Mountains. The following samples were examined in addition to the types.

*Lane Co.*, Oakridge, M, Jun 1952, S. and D. Mulaik (AMNH); 11 mi NE Blue River, Andrews Exp. For., 7 M, F, 18 Apr–10 May 1982, 18 Oct–9 Nov 1982, 16 Jun–7 Jul 1983, 10 Apr–18 May 1984, G. L. Parsons (RLH, NCSM). *Douglas Co.*, 5 mi E Glide, M, F, 5 Mar 1957, V. Roth (AMNH).

### *Caseya benedictae*, NEW SPECIES

(Figs. 147, 148)

*Type specimen.* — Male holotype (AMNH) collected by E. M. Benedict, 20 April 1967, in Charleston Woods near Marine Biological Institute, Coos Co., OR.

*Diagnosis.* — Characterized by large, broad lateral ramus, extending well beyond caudal margin of apical arm, apically rounded and expanded; mesal ramus small; colpocoxite curving broadly caudad, apical arm bent abruptly upright with subquadrate subapical lamina.

*Color.* — Dorsum brown.

*Holotype.* — Facial setae sparse. Ocellaria with rows of 7, 6, 5, 3 and 1 ocelli, respectively. Relative proportions of antennomeres 0.5, 1.2, 2.7, 1.5, 2.0, 1.0, 0.8.

Collum l/w ratio 52%. Pleurotergite 3 shorter than those of segments 2 and 4, margin broadly rounded; 4th pleurotergite with margin broadly rounded. Body length 15 mm.

Gonapophysis short extending to midlength of prefemur, apically rounded. Leg 3 coxal lobe subconical, terminating below level of prefemur. Leg 7 coxa with

cylindrical caudal process, extending to level of prefemur, and short, broad mesal projection.

Anterior gonopod colpocoxite (Fig. 148) curving broadly caudad, apical arm bent abruptly upright, narrowly rounded apically with subquadrate caudal lamina; lateral ramus very large, extending well beyond caudal margin of apical arm, bent ventrad distally, broadly rounded apically; mesal ramus small, poorly developed; flagellar carina incomplete. Flagella parallel. Lateral lamina moderately broad basally, branches diverging and curving caudad, extending to distal extremity of lateral ramus. Mesal lamina not modified. Telopodite divided near midlength into long, acute mesal, and larger lateral branches; intermediate septum well developed.

Posterior gonopod coxal endite (Fig. 147) with two narrowly rounded mesal, and one lateral lobes, latter terminating below ventral margin of telopodite. Telopodite without marginal rim or sulcus. Leg 10 coxa without projections.

*Distribution.*—Known only from the type locality.

***Caseya longiloba*, NEW SPECIES**  
(Figs. 164, 165, 207)

*Type specimens.*—Male holotype (UCD) collected by J. S. Buckett and M. R. Gardner, 22 December 1966, 1.5 mi SW Douglas City, Trinity Co., CA. One male and one female paratypes (UCD) taken by same collectors, 21 Dec 1966, 2.5 mi NW Weaverville, Trinity Co.

*Diagnosis.*—Characterized by moderately long, apically divided and rounded lateral ramus; short, truncate mesal ramus; and by caudally bent, prolonged apical arm, extending well beyond level of rami, apically rounded.

*Color.*—Dorsum brown.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 4 and 2 ocelli, respectively. Relative proportions of antennomeres 0.2, 1.0, 1.0, 2.3, 1.3, 1.7, 1.0, 0.4.

Collum l/w ratio 55%. Pleurotergite 3 with margin broadly rounded; 4th pleurotergite marginally rounded. Body length 20 mm.

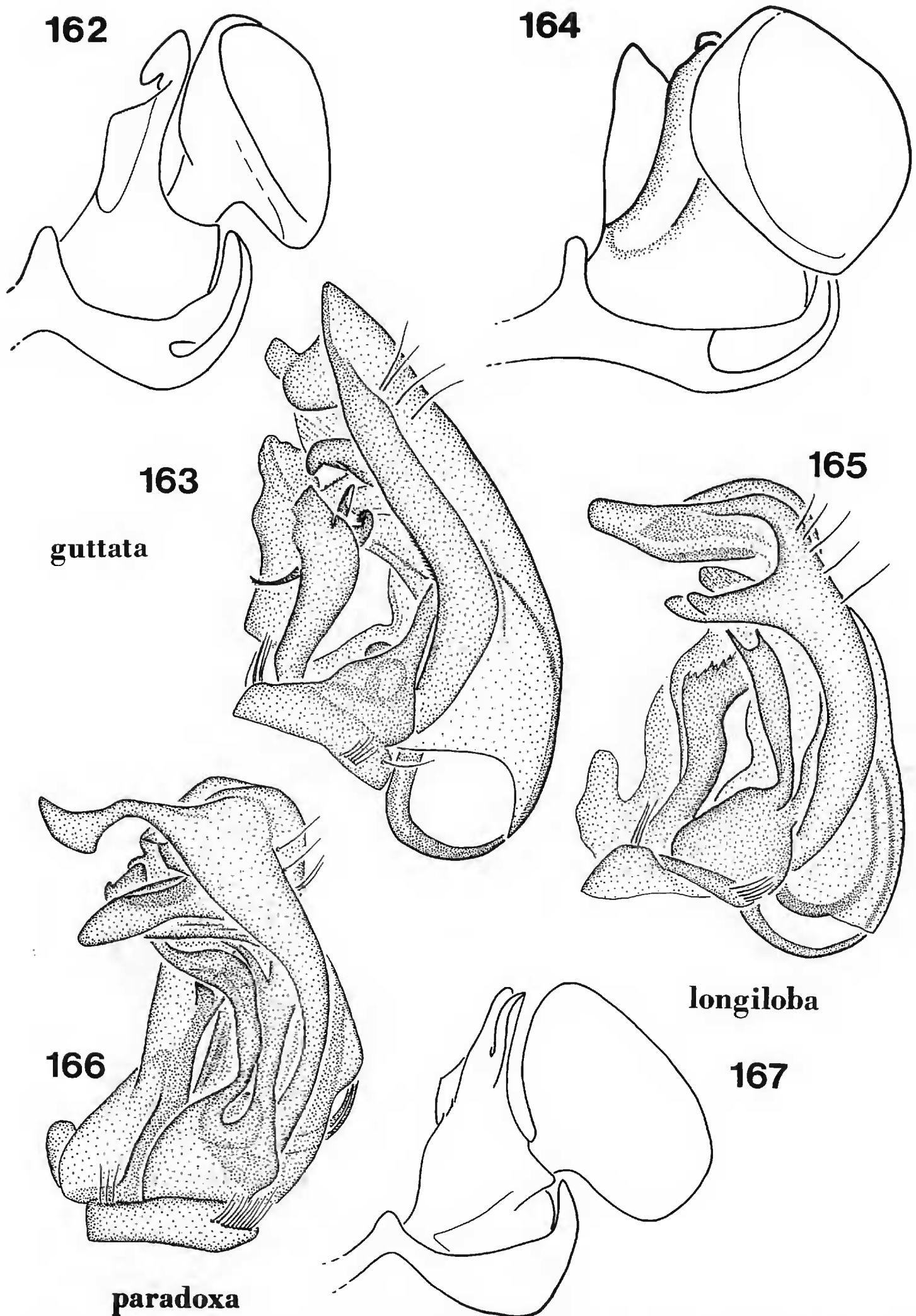
Gonapophysis short, blunt, curving sharply cephalad. Leg 3 coxal lobe subconical, terminating below level of prefemur. Leg 7 coxa with subconical caudal and smaller, curved mesal processes, mesal margin of coxa with tuft of long setae.

Anterior gonopod colpocoxite (Fig. 165) with apical arm bent strongly caudad distally, long and rounded with small proximal mesal spur; lateral ramus moderately long, about half as long as apical arm, apically furcate and rounded; mesal ramus short, truncate; flagellar carina incomplete. Flagella not parallel, mesal one curving in greater arc, exposed basally below carina. Lateral lamina broad basally, branches diverging and extending to level of lateral ramus, caudal one apically bifurcate. Mesal lamina broad, extending to distal level of flagella. Telopodite with serrate laminae on lateral and mesal sides and strongly dissected apical piece; intermediate septum broad, well developed, extending nearly to flagellar bases.

Posterior gonopod coxal endite (Fig. 164) flush with mesal surface of telopodite, with thin mesal lamina. Telopodite with sulcus on anterior and ventral margins. Leg 10 coxa with large, rounded mesocaudal process.

*Female paratype.*—Cyphopod valves unequal, lateral one tapered, mesal valve rounded, with truncate caudal lobe (Fig. 207).

*Distribution.*—Known only from the type and paratype localities.



Figures 162–167. *Caseya* spp. males. 162, 163. *C. guttata*. 162. Right posterior gonopod of holotype, anterior aspect. 163. Left anterior gonopod of topoparatype, lateral aspect. 164, 165. *C. longiloba*. 164. Right posterior gonopod of holotype, anterior aspect. 165. Left anterior gonopod of paratype, lateral aspect. 166, 167. *C. paradoxa* holotype. 166. Left anterior gonopod, lateral aspect. 167. Right posterior gonopod, anterior aspect.



*Remarks.*—The paratypes were taken from thick duff above a stream in oak woods; the holotype was collected in an oak–pine association.

***Caseya westcotti*, NEW SPECIES**  
(Figs. 158, 159, 210, 211)

*Type specimens.*—Male holotype (AMNH) collected by E. M. Benedict, probably in November or December 1971, at Weyerhauser Millicoma Tree Farm, 14 mi E, 2 mi S Allegany, Coos Co., OR. Paratypes as follows: *Coos Co.*, 6 mi S Powers, M, 12 Mar 1968, J. S. Buckett and M. R. Gardner (UCD). *Douglas Co.*, 2 mi E Canyonville, M, F, 6 Nov 1971, EMB (WAS); 2 mi N Melrose, F, 7 Feb 1972, EMB (WAS).

*Diagnosis.*—Characterized by short, broad, subequal lateral and mesal rami; colpocoxite leaning caudad, lateral margin of apical arm scalloped, tip rounded.

*Color.*—Dorsum yellowish with small irregular brown spots.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 4, 3 and 1 ocelli, respectively. Relative proportions of antennomeres 0.3, 1.2, 2.4, 1.4, 1.8, 1.0, 0.7.

Collum l/w ratio 55%. Pleurotergite 3 with margin truncate; 4th pleurotergite with anterior corner produced. Body length 20 mm.

Gonapophysis short, curved, apically acute. Leg 3 coxal lobe slender, subconical, terminating below level of prefemur. Legs 4–6 with padlike coxal swellings. Leg 7 coxa with subtriangular caudal lobe and anterior knob.

Anterior gonopod colpocoxite (Fig. 158) leaning caudad, apical arm with lateral margin scalloped, emarginate, tip rounded; lateral and mesal rami short and broad, subequal, curving ventrad at midlength, apically flattened; flagellar carina broad, incomplete. Flagella not parallel, mesal one curving in greater arc, exposed basally below carina. Lateral lamina broad basally, branches diverging slightly and extending to level of lateral ramus, caudal branch twisted basally. Mesal lamina broad basally, narrowing then expanding, extending to distal level of flagella. Telopodite broad basally, with sharp spur on caudal surface, and mesal, lateral, and terminal projections; intermediate septum broad, well developed, lateral flagellar guide larger than mesal.

Posterior gonopod coxal endite (Fig. 159) broad basally, divided distally into falcate, spiculate mesal, and rounded lateral projections. Telopodite ovoid with strong ventral sulcus. Leg 10 coxa with short, broad, mesocaudal process.

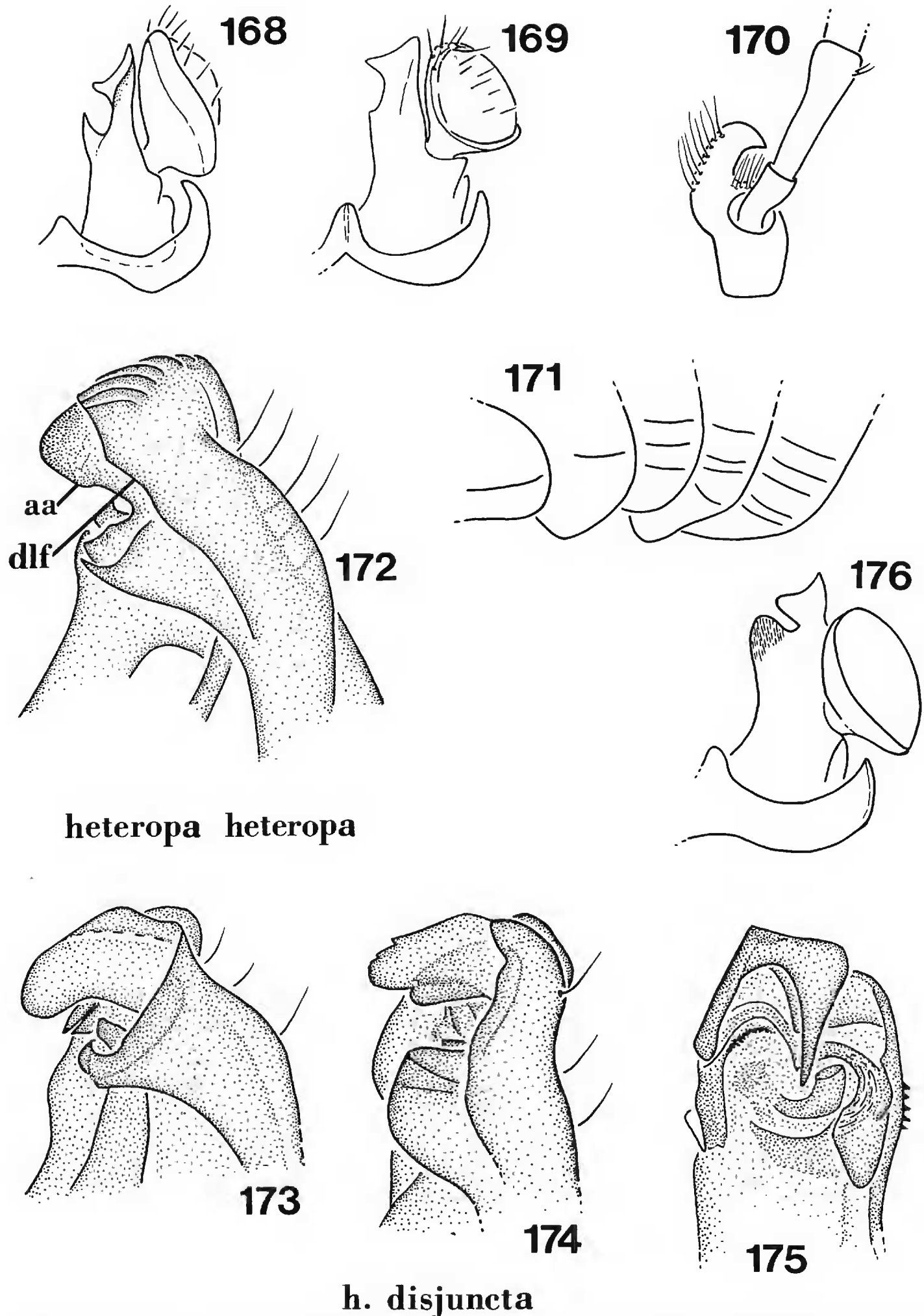
*Female paratype.*—Cyphopod valves subequal, with oblique distal laminae (Figs. 210, 211).

*Distribution.*—From the Cascades to the Pacific coast in west central Oregon. The following samples were examined in addition to the types:

*Jackson Co.*, 3 mi S Ruch, M, 13 Nov 1971, EMB (WAS). *Lane Co.*, Dexter, M, Jan 1970 (UCD). *Lincoln Co.*, 1.4 N Nashville, 2 F, 20 Dec 1971, EMB (WAS).

*Remarks.*—Color varies in *C. westcotti*. Adults from Jackson and Coos counties were medium to dark brown dorsally with depigmented areas around the dorsal setae and ventrolaterad. One male each from Lane and Douglas counties had yellow middorsal stripes.

The flagella and colpocoxites of the anterior gonopods vary. In the north, at Dexter, Lane County, the mesal flagellum curves in a greater arc than in the



**heteropa heteropa**

**h. disjuncta**

Figures 168–176. *Caseya heteropa* subsp. males. 168–172. *C. h. heteropa*. 168. Right posterior gonopod of male from 4 mi N Penngrove, Sonoma Co., CA, anterior aspect. 169. Right posterior gonopod of male from 8 mi E Marshall, Marin Co., CA, anterior aspect. 170. Right gonapophysis of male from 4 mi N Penngrove, lateral aspect. 171. Pleurotergites 1–5 of the same, lateral aspect. 172. Distal extremity of left anterior gonopod of specimen from 8 mi E Marshall, lateral aspect. 173–176. *C. h. disjuncta* paratypes. 173–175. Distal extremities of left anterior gonopods. 173. Male from 12

holotype. Specimens from Douglas and Coos counties resemble the latter, and in that from Ruch, Jackson County, the flagella are nearly parallel and almost completely concealed by the carina. These males also differ in that the lateral margin of the colpocoxite is less scalloped, and the apical arm is longer, acute, and slightly curved.

*Caseya bucketti*, NEW SPECIES  
(Figs. 156, 157, 206)

*Type specimens.*—Male holotype and one male and one female paratypes (UCD) collected by J. S. Buckett and M. R. Gardner, 22 December 1966, 22 mi W Red Bluff, Tehama Co., CA. Other paratypes, taken by same collectors (UCD), as follows: *Shasta Co.*, 6 mi W Redding, F, 21 Dec 1966; Inwood, 4 mi NW Shingletown, M, F, 20 Dec 1966.

*Diagnosis.*—Characterized by broad lateral ramus, length subequal to that of apical arm; short, rounded mesal ramus; strongly bent apical arm, tip with rounded outer lobe and truncate, spiculate inner margin; and large incomplete flagellar carina, extending proximad along mesal flagellum as long sheath.

*Color.*—Dorsum brown.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 4, 3 and 1 ocelli, respectively. Relative proportions of antennomeres 0.2, 1.0, 2.2, 1.2, 1.7, 1.0, 0.4.

Collum l/w ratio 55%. Pleurotergite 3 with margins truncate; 4th pleurotergite marginally truncate. Body length 18 mm.

Gonapophysis short, broad, curving sharply cephalad. Leg 3 coxal lobe subconical, terminating below level of prefemur. Legs 4–6 with padlike coxal swellings. Leg 7 coxa with subconical, caudal process, extending to distal extremity of prefemur, smaller anterior process, and tuft of long mesal setae.

Anterior gonopod colpocoxite (Fig. 157) with apical arm bent strongly caudad distally, expanding apically with rounded outer lobe, inner margin truncate and spiculate; lateral ramus very broad, extending to level of tip of apical arm, curving slightly mesad distally; mesal ramus short, rounded; flagellar carina incomplete, extending as long sheath along mesal flagellum. Flagella divergent basally, mesal one longer, curving broadly cephalad and exposed below carina basally, lateral flagellum shorter, contained within carina. Lateral lamina moderately broad basally, branches diverging, curving or leaning caudad, caudal branch with tooth at midlength, expanding then tapering distad, anterior branch twisted at midlength, tapering distally. Mesal lamina expanding distad and divided into ventral and dorsal branches, former broader and extending to level of flagellar carina. Telopodite with prominent processes, curved one on caudal margin, two mesad, and several distad; intermediate septum well developed.

Posterior gonopod coxal endite (Fig. 156) with rounded mesal margin, anterior surface concave. Telopodite with sulcus on anterior and ventral margins. Leg 10 coxa with elongate, cylindrical mesocaudal process.

←

mi W Winters, Napa Co., CA, lateral aspect. 174. Male from 3 mi W Forestville, Sonoma Co., CA, lateral aspect. 175. Male from 12 mi W Winters, posterior aspect. 176. Right posterior gonopod of male from 3 mi W Forestville, anterior aspect.

*Female paratype.*—Cyphopod valves large, subequal, configurations similar (Fig. 206).

*Distribution.*—Known only from the type and paratype localities.

*Remarks.*—The anterior gonopods of *bucketti* dwarf the telopodites of the posterior gonopods, and the flagellar carina is visible in situ.

***Caseya paradoxa*, NEW SPECIES**

(Figs. 166, 167, 208)

*Type specimens.*—Male holotype and one male and 11 female paratypes (UCD) collected by J. S. Buckett and M. R. Gardner, 2 December 1967, 2 mi E Briceburg, Mariposa Co., CA. One male and five female paratypes (UCD) taken by same collectors, 8 February 1969, 14 mi E Briceburg, Mariposa Co.

*Diagnosis.*—Characterized by broad, straight lateral ramus, slightly shorter than apical arm, ventral surface excavated; mesal ramus short, truncate; colpocoxite with apical arm bending strongly caudad, greatly expanding at level of bend, narrowing, then expanding apically.

*Color.*—Dorsum brown.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 4 and 2 ocelli, respectively. Relative proportions of antennomeres 0.4, 1.4, 2.8, 1.6, 2.2, 1.0, 0.7.

Collum l/w ratio 56%. Pleurotergites 3–4 with margins broadly rounded. Body length 18 mm.

Gonapophysis short, acute, curving sharply cephalad. Leg 3 coxal lobe rounded, extending to distal extremity of prefemur. Legs 4–6 with padlike coxal swellings. Leg 7 coxa with subconical caudal process and mesal knob.

Anterior gonopod colpocoxite (Fig. 166) with apical arm bent strongly caudad, expanding greatly at level of bend, narrowing quickly, then expanding to broad termination, outer corner prolonged, tip blunt; lateral ramus broad, straight, ventral surface excavated, directed slightly dorsad, slightly shorter than apical arm, apically blunt; mesal ramus short, truncate; flagellar carina narrow, incomplete. Flagella closely parallel. Lateral lamina broad basally, branches separated proximad, converging and subparallel thereafter, widening at midlength, narrowing, then widening to subacuminate tips. Mesal lamina divided distad, anterior branch expanding and covering most of distomesal surface of gonopod, posterior branch extending toward apex of telopodite in which rounded lobe with curved acute projection near midlength. Telopodite with acute lateral process, and long distal lamina adjacent to lateral ramus; intermediate septum small, ovoid.

Posterior gonopod coxal endite (Fig. 167) with truncate mesal lamina, divided distal to midlength into two closely appressed projections. Telopodite with lateral surface convex, not margined. Leg 10 coxa with robust mesocaudal process.

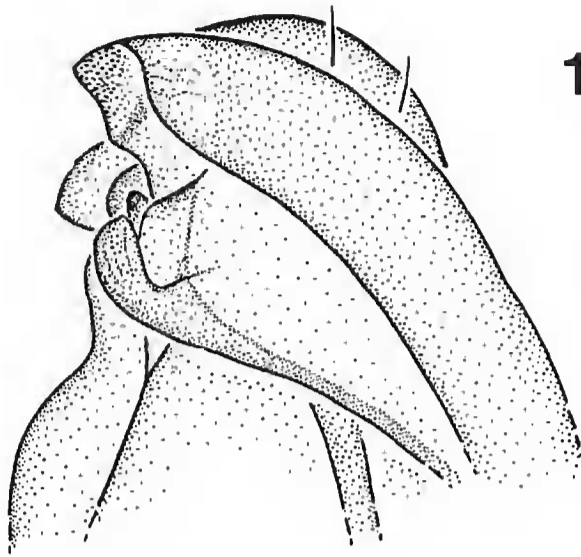
*Female paratype.*—Cyphopod valves unequal, mesal valve larger, extending caudad into uncinuate lobe (Fig. 208).

*Distribution.*—Known only from the type and paratype localities.

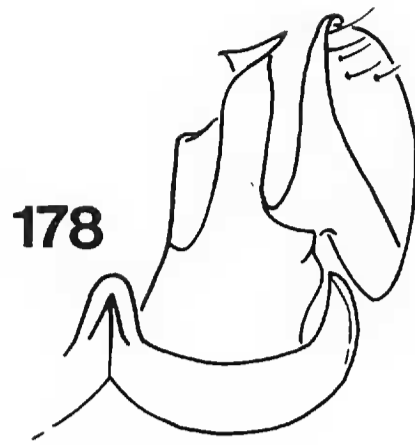
***Caseya megasoma*, NEW SPECIES**

(Figs. 160, 161, 209)

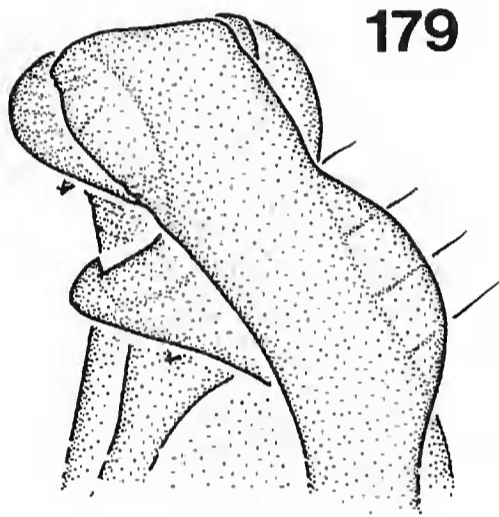
*Type specimens.*—Male holotype (AMNH) and seven male and four female paratypes (WAS) collected by D. R. Malcolm, 30 October 1960, along OR hwy.



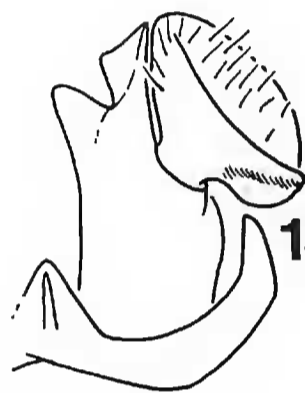
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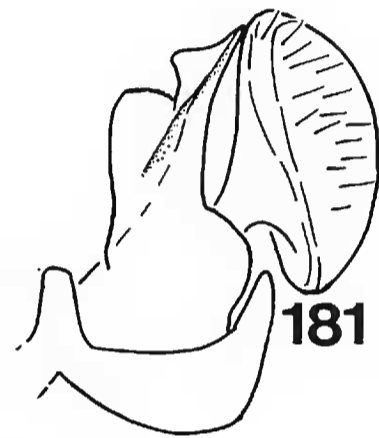
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***h. oraria***

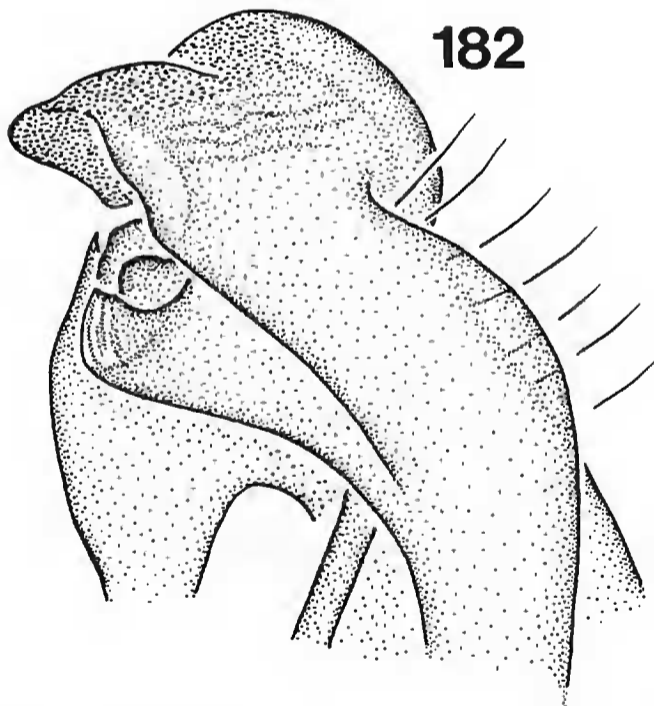
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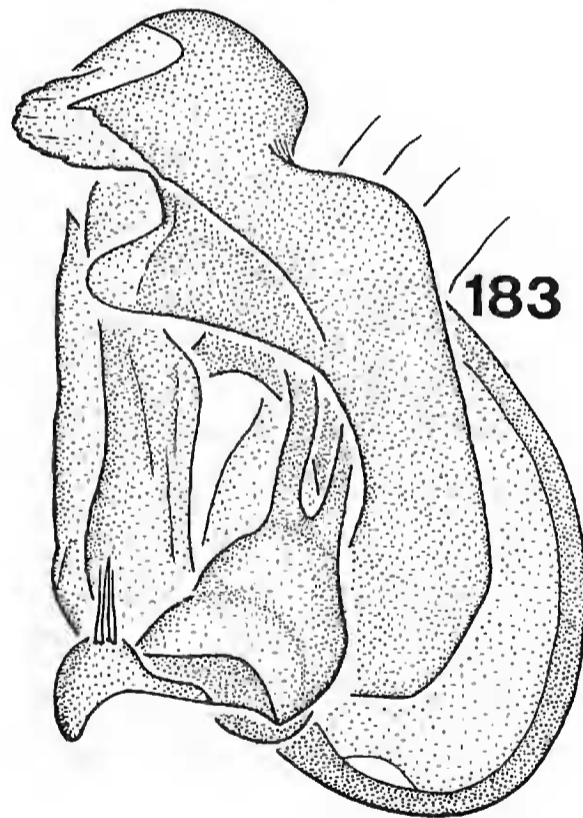
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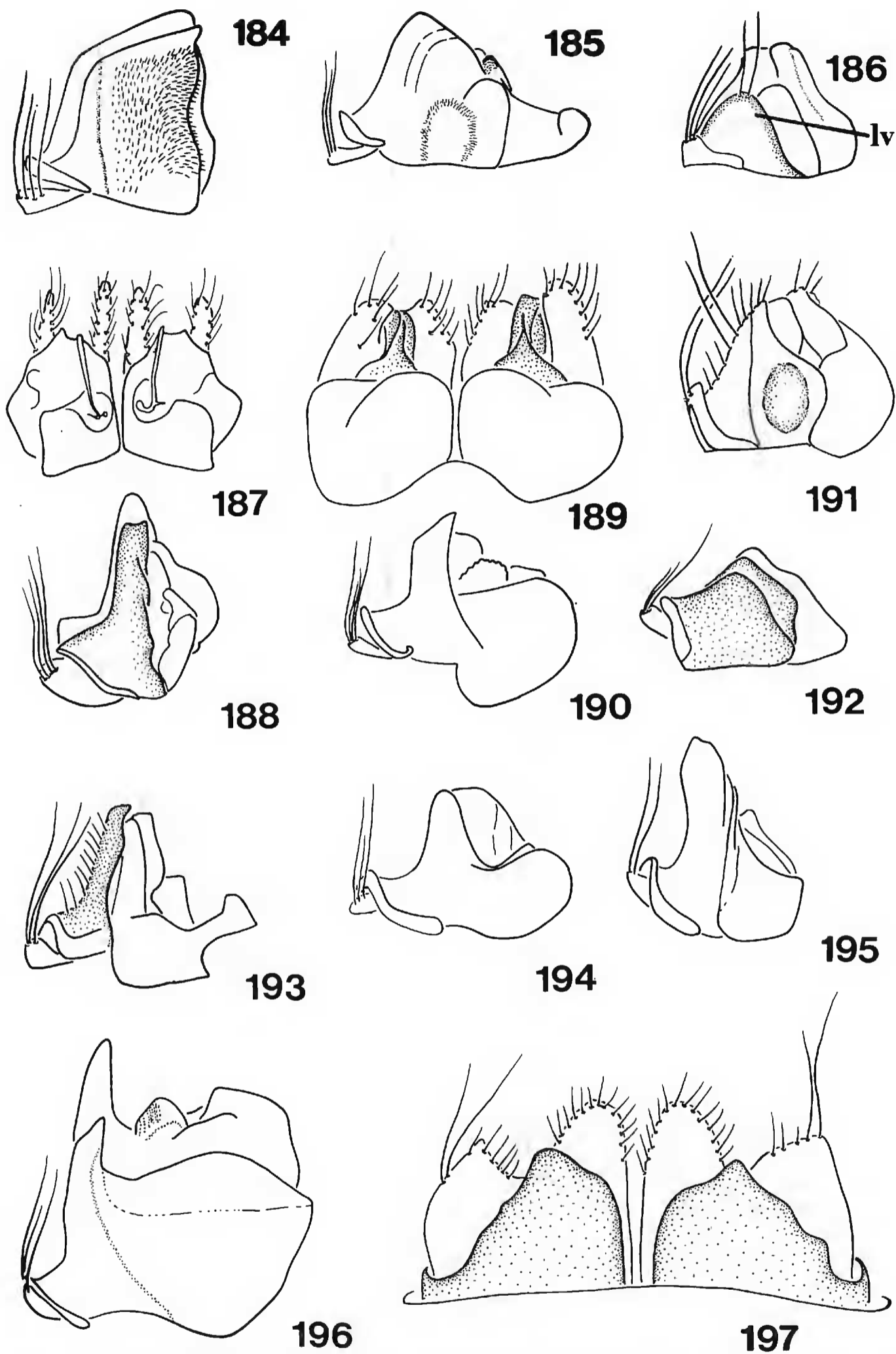
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183

***h. montana***

Figures 177–183. *Caseya heteropa* subsp. males. 177, 178. *C. h. oraria*, topoparatype. 177. Distal extremity of left anterior gonopod, lateral aspect. 178. Right posterior gonopod, anterior aspect. 179–183. *C. h. montana* paratypes. 179. Distal extremity of left anterior gonopod of male from 3.5 mi N Leesville, Colusa Co., CA, lateral aspect. 180. Right posterior gonopod of the same, anterior aspect. 181. Right posterior gonopod of male from Butte Co., CA, anterior aspect. 182. Distal extremity of left anterior gonopod of specimen from 12 mi N Bear Valley, Mariposa Co., CA. 183. Left anterior gonopod of male from El Dorado Co., CA, lateral aspect.



Figures 184–197. *Caseya* spp. females. 184–186. Right cyphopods of paratypes, lateral views. 184. *C. douglasia*, 2 mi SE Day Cr., Douglas Co., OR. 185. *C. bryophila*, French Gulch, Jackson Co., OR. 186. *C. borealis*, 1.5 mi S Grapeview, Mason Co., WA. 187, 188. Cyphopods of *C. dendrogona* paratype, 6 mi E Allegany, Coos Co., OR. 187. Posterior aspect. 188. Right cyphopod, lateral aspect.

34 at Benton/Lincoln Co. line. Additional paratypes, all from Oregon, as follows: *Benton Co.*, 2.3 mi NW Glenbrook, M, 4 Dec 1971, EMB (WAS); 8 mi SW Philomath, M, 27 Apr 1969, R. L. Westcott (UCD). *Tillamook Co.*, 4 mi SE Blaine, M, F, 15 Mar 1972, EMB (WAS).

*Diagnosis.*—Characterized by short, broad, apically rounded and spiculate lateral ramus; large mesal ramus with curved distal lamina; and relatively upright colpocoxite, apical arm bending obliquely caudad, narrowing to prolonged acuminate tip.

*Color.*—Dorsum brown, depigmented areas around dorsal setae converging to form continuous yellow middorsal stripe.

*Holotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 4, 3 and 1 ocelli, respectively. Relative proportions of antennomeres 0.3, 1.6, 3.7, 1.9, 2.5, 1.0, and 0.7.

Collum l/w ratio 49%. Pleurotergite 3 with margin broadly rounded; that of segment 4 marginally truncate. Body length 20 mm.

Gonapophysis short, acute, curving sharply cephalad, ventral surface densely setose. Leg 3 coxal lobe conical, extending to midlength of prefemur. Leg 7 coxa with subconical ventral process, subequal to prefemur in length, and small, anterior knob.

Anterior gonopod colpocoxite (Fig. 161) relatively upright, apical arm bending obliquely caudad, tapering rapidly to prolonged acuminate tip; lateral ramus short, basally broad, apically rounded and spiculate; mesal ramus large, with curved distal lamina; flagellar carina broad, complete. Flagella parallel. Lateral lamina moderately broad basally, divided relatively proximad into unequal, subparallel branches, caudal one shorter, expanding at midlength, apically acuminate, anterior branch longer, bisinuate, tapering to acute tip. Mesal lamina divided into broad anterior and long posterior branches. Telopodite with caudal surface concave, distally with short, acute mesal, and broad, serrate lateral projections, apex rounded; intermediate septum with lateral and mesal flagellar guides.

Posterior gonopod coxal endite (Fig. 160) divided, with round mesal lamina and broad, curved lateral projection adjacent to telopodite. Latter flattened, with deep lateral sulcus. Leg 10 coxa with globose mesocaudal process.

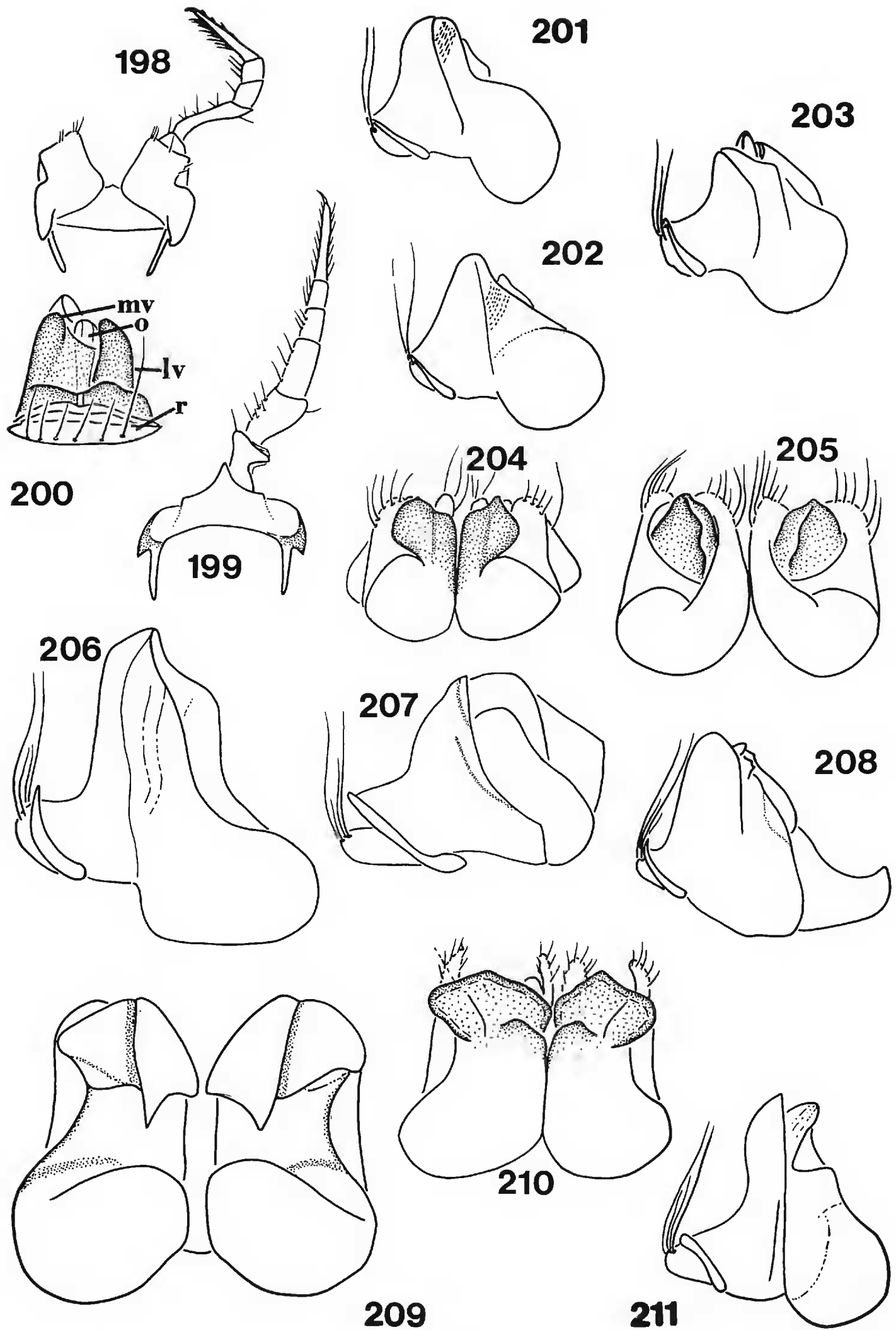
*Female paratype.*—Cyphopod valves broad, subequal, lateral one with caudal corner sharply acute (Fig. 209).

*Distribution.*—The north-central Oregon coast from Benton/Lincoln to Tillamook counties. In addition to the types, the following samples were examined.

*Benton Co.*, 10 mi N Philomath, in stomach of newt, M, date unknown, R. Freiburg (FSCA). *Lincoln Co.*, along OR hwy. 34 between Tidewater and Waldport, M, 3 F, 19 Sep 1946, J. C. Chamberlin (FSCA).

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189. Cyphopods of *C. coxalis*, Ben Lomond, Santa Cruz Co., CA, posterior aspect. 190. Right cyphopod of the same, lateral aspect. 191–196. *Caseya* spp., right cyphopod, lateral aspect. 191. *C. shastensis* paratype. 192. *C. subtilis* paratype, Lane Co., OR. 193. *C. taliae* topoparatype. 194. *C. occidentalis* paratype. 195. *C. dorada*, 6 mi S El Dorado, El Dorado Co., CA. 196. *C. sequoia* paratype. 197. Cyphopods of *C. prionota* paratype, Fresno Co., CA, posterior aspect.



Figures 198–211. *Caseya* spp. females. 198–200. *C. h. heteropa*, 4 mi NE Penngrove, Sonoma Co., CA. 198. Leg two, posterior aspect. 199. Leg three, anterior aspect. 200. Right cyphopod, anterior aspect. 201–203. *C. heteropa* subspp., right cyphopods, lateral aspects. 201. *C. h. disjuncta* paratype, 3 mi W Forestville, Sonoma Co., CA. 202. *C. h. heteropa*, Lagunitas, Marin Co., CA. 203. *C. h. oraria*



***Caseya guttata*, NEW SPECIES**  
(Figs. 162, 163)

*Type specimens.*—Male holotype and one male paratype (UCD) collected by J. Ward, 29 January 1969, 4 mi E Sunny Brae, Humboldt Co., CA. One male and two female paratypes (WAS) collected by E. M. Benedict, 7 mi N, 3 mi W Brookings, 12 Feb 1972, Curry Co., OR.

*Diagnosis.*—Characterized by short lateral ramus, subequal to apical arm, bending slightly dorsad apically; broad mesal ramus with slender distal process; colpocoxite leaning caudad, extending slightly beyond level of bend, apical arm broad, straight, outer corner produced, quadrate.

*Color.*—Dorsum with yellow middorsal stripe and large lateral blotches on alternate segments imparting checkered or mottled appearance.

*Holotype.*—Head lightly pilose. Ocellaria with rows of 7, 6, 5, 4, 3 and 1 ocelli, respectively. Relative proportions of antennomeres 0.3, 1.3, 2.7, 1.6, 2.0, 1.0, 0.7.

Collum l/w ratio 57%. Pleurotergite 3 with margin truncate; 4th pleurotergite with margin rounded. Body length 20 mm.

Gonapophysis short, acute, curved sharply cephalad. Leg 3 coxal lobe subconical, extending to distal extremity of femur. Leg 7 coxa with conical caudal process, length shorter than that of prefemur, and short, curved mesal projection.

Anterior gonopod colpocoxite (Fig. 163) leaning caudad, apical arm bending abruptly caudad, short and broad, outer corner produced, quadrate; lateral ramus short, length subequal to that of apical arm, bending slightly dorsad apically, tip rounded; mesal ramus broad, rounded, with slender distal process directed toward tip of colpocoxite stem; flagellar carina broad, incomplete, with short sheath extending proximad along flagella. Latter closely parallel. Lateral lamina with short basal piece, branches diverging and subequal, caudal one forked. Mesal lamina divided into broad anterior branch, extending distad along flagella, and broad posterior branch, curving laterad behind mesal ramus. Telopodite with caudal surface concave, with slender caudoventral, acute distolateral, and broad mesal processes, apically rounded; intermediate septum broad, with lateral and mesal guides.

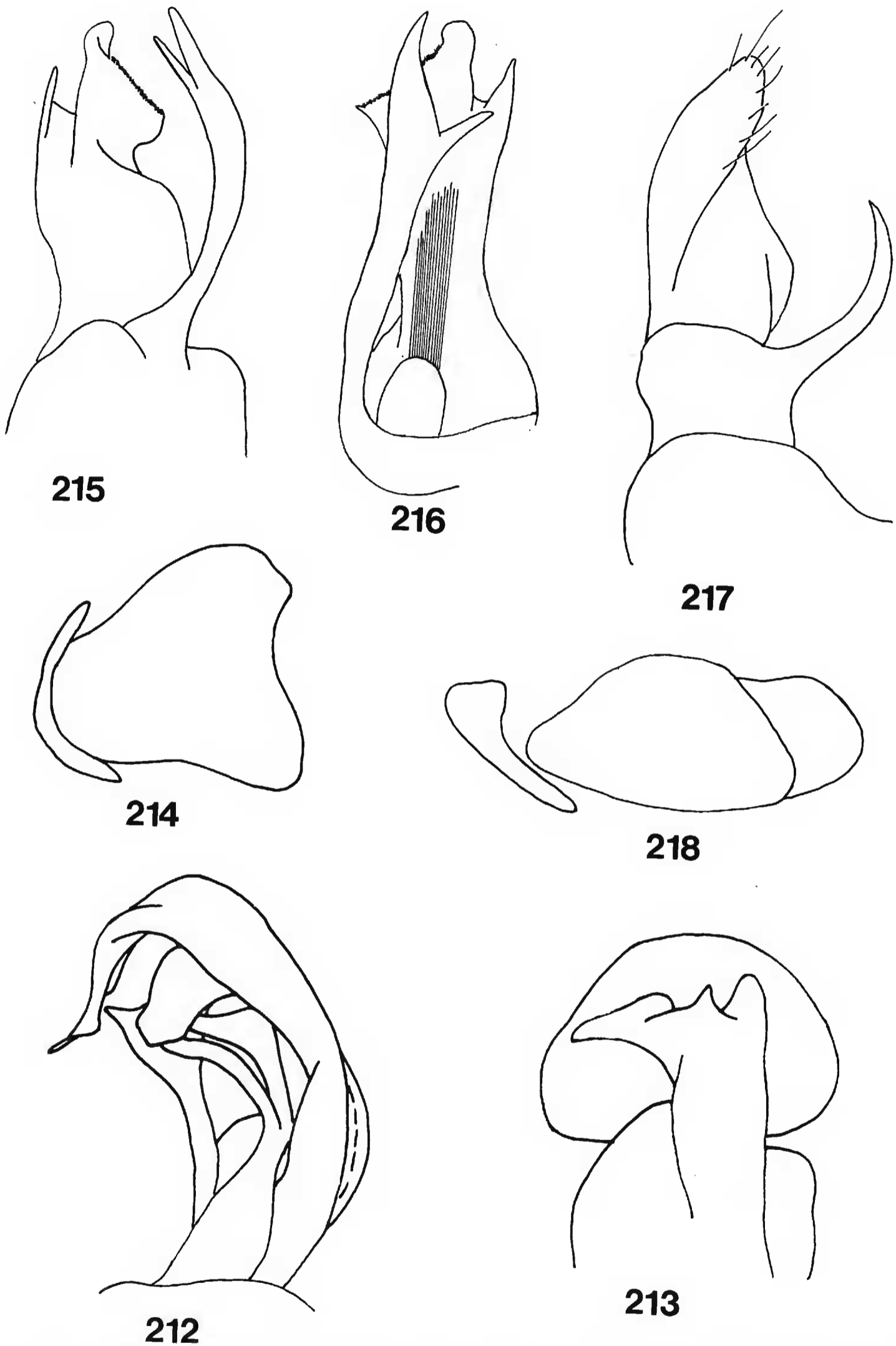
Posterior gonopod coxal endite (Fig. 162) not divided, mesal surface concave, curled dorsad apically. Telopodite with deep sulcus along caudal margin. Leg 10 coxa with globose mesocaudal process.

*Distribution.*—Curry County, Oregon, to Humboldt County, California. The following sample was examined in addition to the types.

CALIFORNIA: *Humboldt Co.*, Eureka, M, 13 Jul 1937, R. V. Chamberlin (NMNH).

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topoparatype. 204, 205. *C. heteropa* subsp. cyphopods, posterior aspects. 204. *C. h. disjuncta* paratype, 12 mi W Winters, Napa Co., CA. 205. *C. h. montana* paratype, Bear Valley, Mariposa Co., CA. 206–208. Right cyphopods, lateral aspects. 206. *C. bucketti* paratype, Inwood, Shasta Co., CA. 207. *C. longiloba* paratype, Trinity Co., CA. 208. *C. paradoxa* paratype, 2 mi E Briceburg, Mariposa Co., CA. 209, 210. Cyphopods, posterior aspects. 209. *C. megasoma* paratype, Benton Co., OR. 210. *C. westcotti* paratype, 3 mi N Myrtle Cr., Douglas Co., OR. 211. *C. westcotti* paratype, right cyphopod, 2 mi E Canyonville, Douglas Co., OR, lateral aspect.



Figures 212–218. *Caseya similis*, *Opiona siliquae*. 212–214. *C. similis*. 212, 213. Holotype. 212. Left anterior gonopod, lateral view. 213. Right posterior gonopod, mesal view. 214. Left cyphopod of female from Los Angeles, caudal view. 215–218. *O. siliquae*. 215–217. Holotype. 215. Left anterior gonopod, lateral view. 216. The same caudal view. 217. Left posterior gonopod, anterior view. 218. Left cyphopod of female, caudal view.



Figure 219. Distribution of the family Caseyidae. Dots and horizontal shading, *Underwoodia*; stars, undetermined forms; vertical shading, western genera; square, disjunct Harney County, Oregon, population of *Vasingtona irritans*.

### *Caseya heteropa* Cook and Collins

*Diagnosis.* — Characterized by short, broad, apically truncate lateral ramus, ventral surface variably excavate; broad rounded mesal ramus; colpocoxite leaning caudad, apical arm short, bending caudad, variably blunt, lateral surface flared at level of bend, continuing into variable distolateral flange.

*Remarks.* — The first western caseyid to be described, *C. heteropa* is abundant and widespread in California, particularly along the coast in the vicinity of San Francisco Bay. Cook and Collins (1895) characterized a male and female, but the former has disappeared and the latter is labeled the holotype in the NMNH. The type locality is uncertain since the specimens were found in a bottle with “a specimen of *Paeromopus* which is known with certainty to have been taken on the hills back to Saucelito (sic), across the Golden Gate from San Francisco.” They illustrated the coxal endite of the posterior gonopod, which is particularly variable, but the configuration matches that of a specimen from Lagunitas and fits closely with other material from Marin County. Therefore, the type locality is restricted to Marin County.

*Caseya heteropa* is highly variable, and though specific intergrade material is lacking, four general forms are so similar that we consider them races of a single widespread species.

*Caseya heteropa heteropa* Cook and Collins

(Figs. 1, 168–172, 202)

*Caseya heteropus* Cook and Collins, 1895:85, pl. 12, figs. 209–219; Chamberlin and Hoffman, 1958:87; Buckett, 1964:13; Shear, 1972, figs. 431–433, 444.

*Caseya dynotypa* Chamberlin, 1947:9; Loomis, 1966:225. NEW SYNONYMY.

*Caseya dynopta*: Chamberlin and Hoffman, 1958:87; Buckett, 1964:13.

*Type specimen.*—Female holotype (NMNH) collected by T. L. Casey on unknown date from unknown locality in Marin Co., CA. Male paratype lost.

*Diagnosis.*—Characterized by broad, carinate distolateral flange; apical arm slightly exposed in lateral view; posterior gonopod with small mesal tooth on coxal endite.

*Color.*—Dorsum brown.

*Male topotype.*—Facial setae sparse. Ocellaria with rows of 7, 6, 5, 4 and 3 ocelli, respectively. Relative proportions of antennomeres 0.3, 0.8, 2.1, 1.0, 1.5, 1.0, 0.4.

Collum l/w ratio 54%. Pleurotergite 3 with margin truncate, anterior corner slightly produced; 4th pleurotergite rounded (Fig. 171). Body length 15 mm.

Gonapophysis short, acute, curved sharply cephalad (Fig. 170). Leg 3 coxal lobe subconical, extending to distal level of prefemur. Legs 4–6 with rounded coxal swellings. Leg 7 coxa with short, cylindrical and small acute mesal processes and tuft of long mesal setae.

Anterior gonopod colpocoxite (Fig. 172) leaning caudad, expanding distad, apical arm bending caudad, short and blunt, distolateral flange (lf, Fig. 172) broad, with six distal carinae; lateral ramus short and broad, apically truncate, ventral surface slightly excavate; mesal ramus broad, rounded, with two small caudal processes; flagellar carina broad, incomplete. Flagella parallel. Lateral lamina broad basally, branches widely separated and diverging, apically subacuminate. Mesal lamina large, curving broadly caudad, divided distad into two short, blunt branches. Telopodite narrowing gradually to acuminate tip with three small apical projections; intermediate septum broad.

Posterior gonopod coxal endite (Fig. 169) with small tooth on mesal surface, apically expanded, flattened. Telopodite with nearly complete marginal sulcus. Leg 10 coxa with elongate mesocaudal process.

*Female topotype.*—Cyphopod valves unequal, lateral larger with rounded caudal lobe (Fig. 202).

*Distribution.*—Monterey to Sonoma counties, California. The following additional samples were examined:

*Monterey Co.*, 1 mi N Carmel, F, 30 Dec 1964 (UCD); Hastings Res, 2 F, 14 Feb and 23 Mar 1946, J. M. Linsdale (NMNH); Monterey, Del Monte For., M, F, 10 Feb 1964, R. Johnson (FSCA); Palo Colorado Cyn., 2 M, 2 F, 7 Feb 1964, R. Johnson (FSCA); 4 mi NW Big Sur, 3 M, 3 F, 21 Dec 1968 (UCD); 10 mi SW Salinas, M, 3 F, 21 Dec 1968 (UCD); 40 mi S Monterey, 2 F, 21 Feb 1964, R. Johnson (FSCA). *San Benito Co.*, Bickmore Cyn., M, 14 Feb 1964, R. Johnson (FSCA). *Santa Cruz Co.*, 5 mi NW Loma Prieta, M, 29 Dec 1966 (UCD); Big Basin, F, 20 Feb 1968, P. Rubtzoff (CAS). *Santa Clara Co.*, 3 mi W Stevens Cr. Dam, nr. Cupertino, M, 3 F, 28 Dec 1966 (UCD); Milpitas, F, 30 Dec 1964 (UCD); 12 mi W Morgan Hill, F, 21 Feb 1968, W. J. Turner (NCSM). *San Mateo*

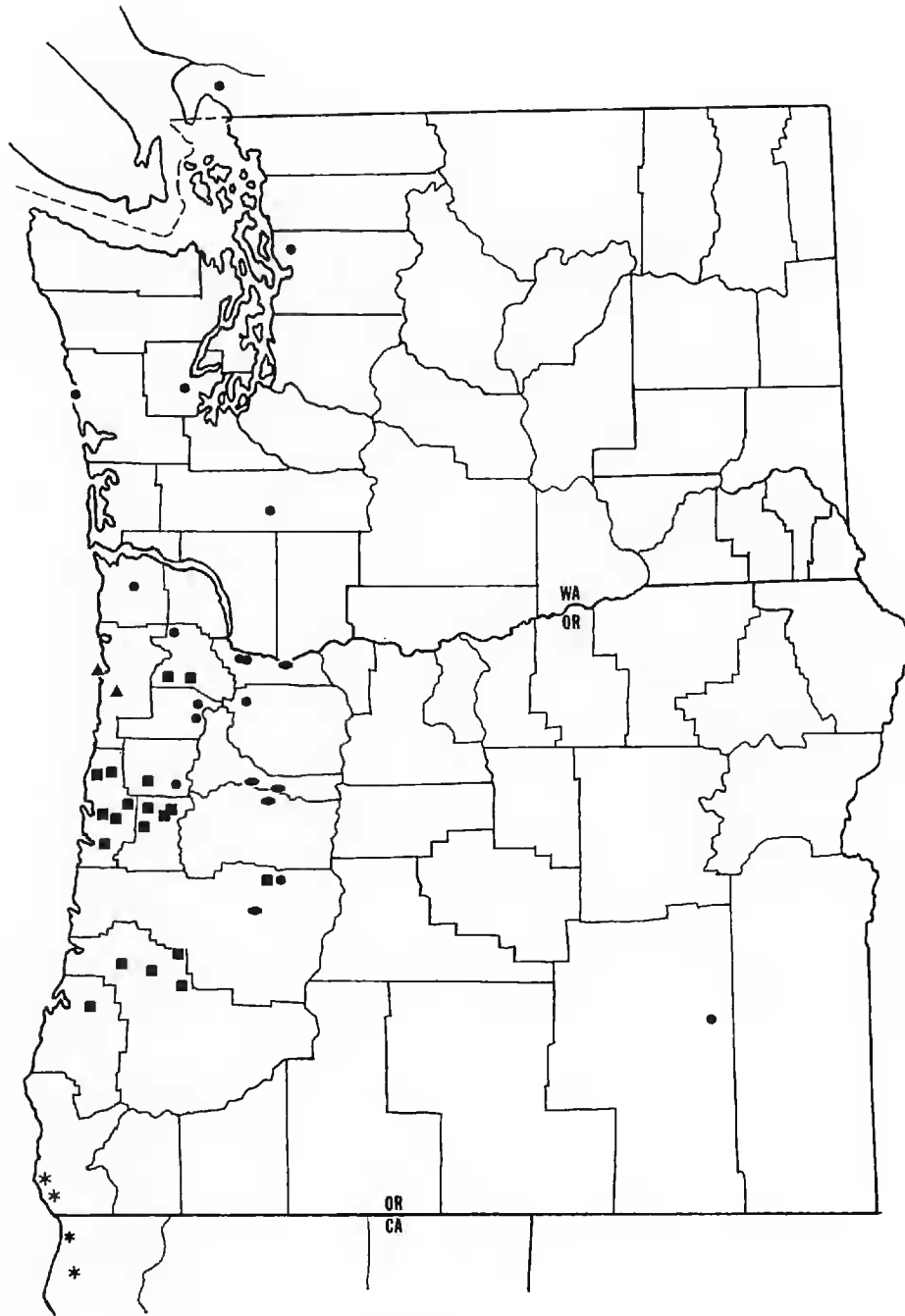


Figure 220. Distributions of *Vasingtona* and *Ochrogramma*. Dots, *V. irritans*; ovals, *O. formosula*; triangles, *O. heterogona*; squares, *O. bentona*; asterisks, *O. haigi*.

*Co.*, Stanford Univ., M, 4 F, 29 Dec 1964 (UCD); summit of La Honda grade, juvs., 20 Mar 1921, R. V. Chamberlin (FSCA). *Alameda Co.*, Castro Valley, F, 27 Dec 1964 (UCD). *Solano Co.*, Cordelia, M, 3 F, 20 Feb 1929, O. F. Cook (NMNH); 2 mi W Cordelia, M, F, 29 Nov 1968 (UCD); 2 mi E Cordelia, Green Valley Rd., F, 25 Mar 1958, F. Raney (NMNH). *Marin Co.*, Samuel P. Taylor St. Pk., M, F, 27 Mar 1971 (UCD), M, 16 Jan 1960, D. D. Linsdale (CIS); Tomales Bay St. Pk., F, 6 Feb 1959 (AMNH); Paradise Valley, nr. Bolinas, F, 22 Mar 1966, C. W. O'Brien (UCD); 8 mi E Marshall, M, 12 Nov 1964 (UCD); Lagunitas, M, 3 F, 9 Jan 1965 (UCD); Ring Mt. Res. off Corte Madera, M, 18 Feb 1982, V. F. Lee (CAS); 1 mi W Olema, MM, FF, 28 Feb 1976, J. T. Doyen (CIS); Pt. Reyes Nat. Seashore, M, 14 Feb 1980, P. R. Kimsey and R. O. Schuster (UCD). *Sonoma Co.*, 4 mi NE Penngrove, 3 M, 5 F, 26 Nov 1965 (UCD); 7 mi NE Santa Rosa, 2 M, 26 Nov 1964 (UCD).

*Remarks.*—Abundant around San Francisco and Monterey bays, the nominate subspecies is easily recognized by the carinae on the distolateral flange, which is

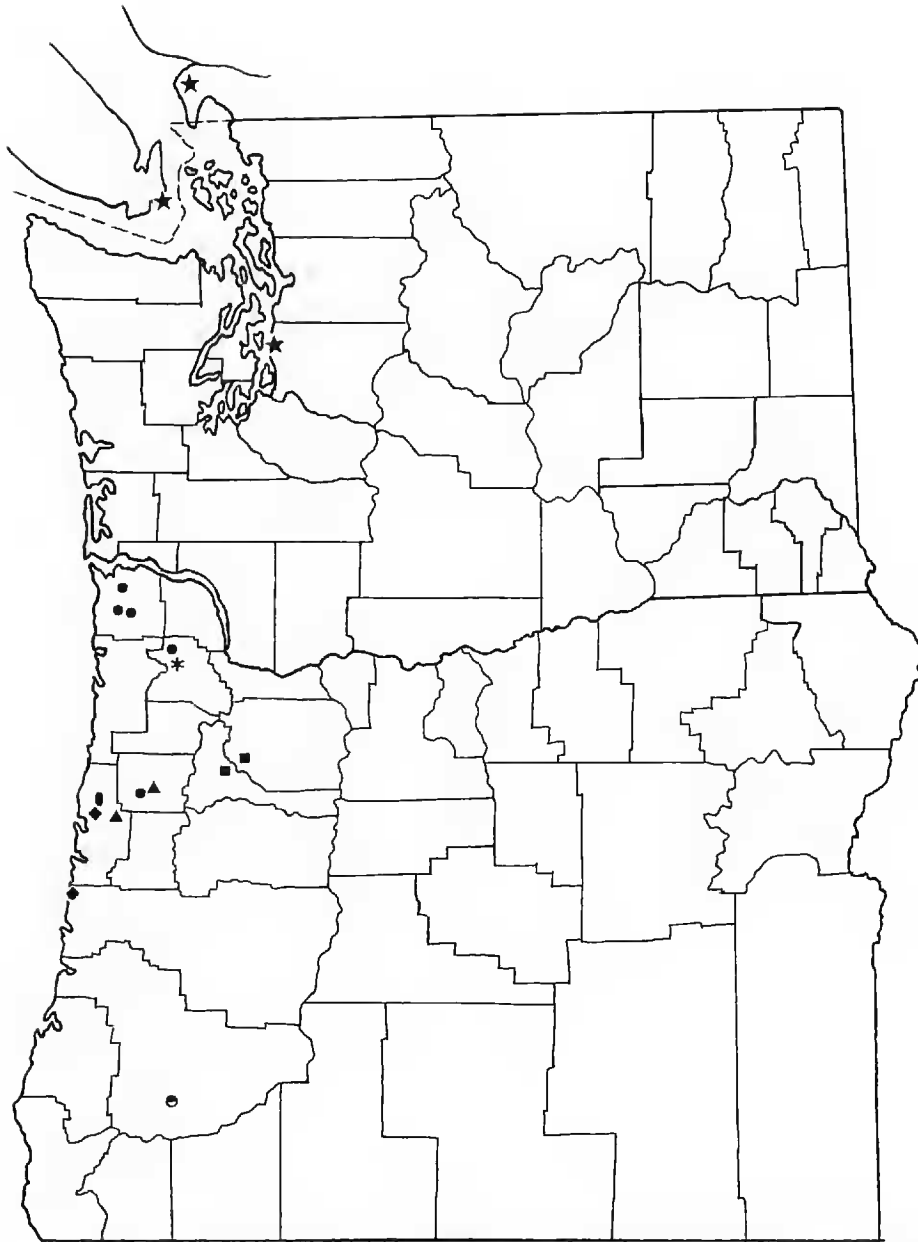


Figure 221. Distributions of *Opiona* and *Metopiona* in British Columbia, Washington, and Oregon. Stars, *O. columbiana*; oval, *O. confusa*; dots, *O. goedeni*; triangles, *O. casualis*; squares, *O. facetia*; diamonds, *O. fisheri*; half-shaded dot, *O. scytonotoides*; asterisk, *M. sheari*.

smaller in males from Sonoma and Solano counties and covers less of the apical arm than in Marin County males. On the southern range periphery in Monterey County, the apical arm is broader and the flange is narrower. The coxal endite of the posterior gonopod has a mesal projection which varies from a small tooth to a distinct spur (Figs. 168, 169).

***Caseya heteropa disjuncta*, NEW SUBSPECIES**  
(Figs. 111–117, 173–176, 201, 204)

*Type specimens.* — Male holotype (UCD) collected by J. S. Buckett, 25 November 1964, 3 mi W Forestville, Sonoma Co., CA. Paratypes as follows: *Napa Co.*, 3 mi W Oakville, 6 F, 3 Jan 1958, R. O. Schuster, F. Raney (NMNH); 7 mi W Oakville, 7 M, 8 F, juvs., 13 Dec 1957, R. O. Schuster, L. M. Smith (NMNH); 9 mi S Monticello, juv., 22 Jan 1958, R. O. Schuster (UCD); 16 mi W Winters, M, 2 F, 27 Dec 1966, R. C. Gardner and S. E. Harrison (UCD); 12 mi W Winters, 4 M, 2 F, 12 Nov 1964 (UCD); 4 mi N Calistoga, F, 13 Mar 1966 R. F. Denno (UCD). *Solano Co.*, 9 mi W Winters, 4 M, 4 juvs., 19 Dec 1964 (UCD). *Sonoma Co.*, 7 mi NW Cloverdale, 3 M, F, 24 Dec 1964 (UCD); 3 mi W Forestville, 15 M, 11 F, 26 Nov 1964 (UCD); 10 mi NE Santa Rosa, M, 5 F, 27 Nov 1965



Figure 222. Distribution of *Opiona* in California. Dots, *O. c. communis*; squares, *O. communis angusta*; triangles, *O. communis proluxa*; solid stars, *O. exigua*; open star, *O. siliquae*; diamonds, *O. bifurcata*; oval, *O. berryessae*; asterisk, *O. distincta*.

(UCD); Armstrong Grove St. Pk., M, 6 F, 26 Nov 1964 (UCD), M, 2 F, 9 Dec 1954, R. O. Schuster (UCD).

*Diagnosis.* — Characterized by narrower distolateral flange, without carinae; apical arm nearly completely exposed, apically rounded to lightly serrate (Figs. 173–175); posterior gonopod with mesal projection of coxal endite broadly rounded, lightly striate (Fig. 176); cyphopods (Figs. 201, 204) with lateral valve larger, extending into rounded caudal lobe.

*Distribution.* — North of San Francisco Bay from Sonoma to Mendocino counties, inland to the western edge of Yolo and Solano counties. The following sample was examined in addition to the types:

Yolo Co., 6 mi N Rumsey, M, F, 9 Feb 1960, L. M. Smith and R. O. Schuster (FSCA).

*Remarks.* — This subspecies was encountered in moist redwood forest, Douglas fir-madrone-maple duff, and under the coast live oak.

***Caseya heteropa oraria*, NEW SUBSPECIES**  
(Figs. 177, 178, 203)

*Type specimens.* — Male holotype and one male and four female paratypes (UCD) collected by J. S. Buckett, M. R. Gardner, and J. R. Helfer, 22 December 1964,

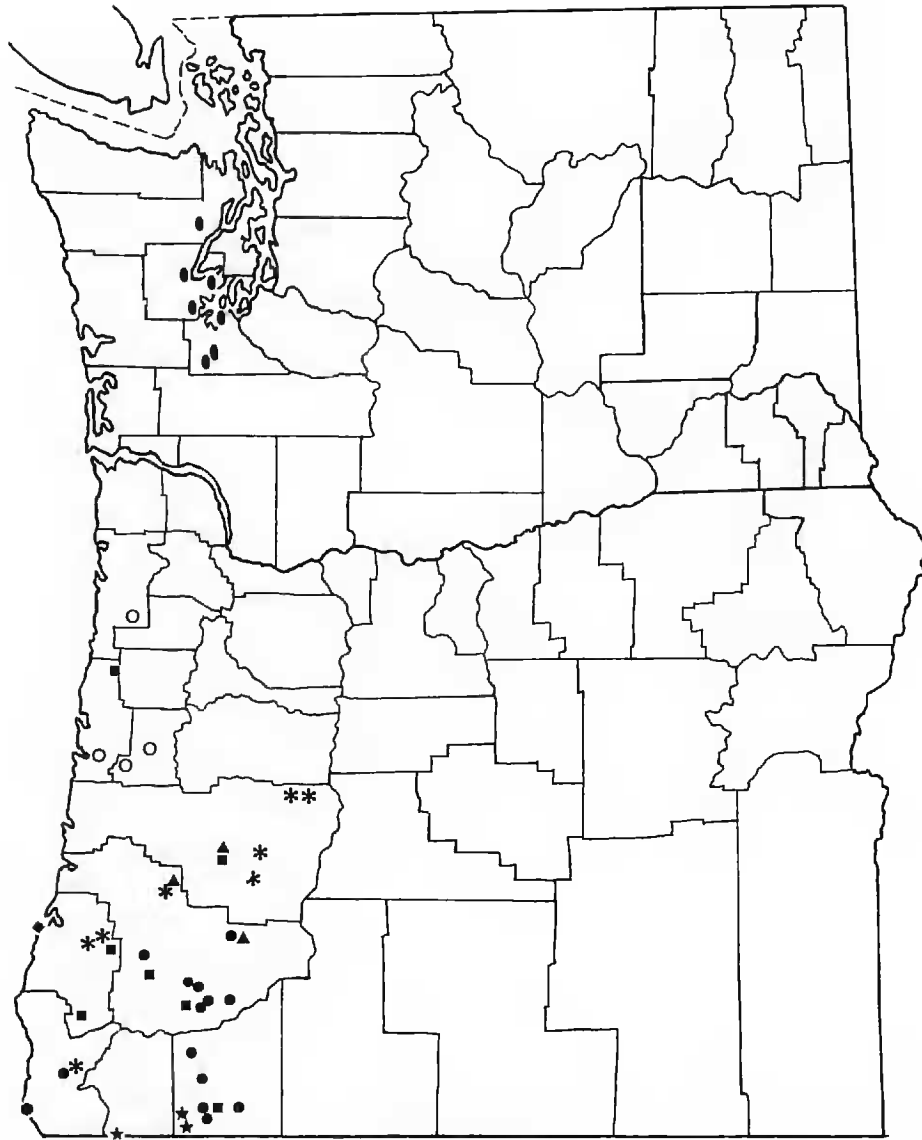


Figure 223. Distribution of *Caseya* in Washington and Oregon. Ovals, *C. borealis*; circles, *C. megasoma*; squares, *C. westcotti*; asterisks, *C. dendrogona*; triangles, *C. subtilis*; dots, *C. douglasia*; diamond, *C. benedictae*; stars, *C. bryophila*; hexagon, *C. guttata*.

along Caspar Little Lake Rd., 5 mi NE Mendocino, Mendocino Co., CA. Other paratypes from type locality (UCD) by same collectors as follows: M, 10 Jan 1965; F, 28 Nov 1965; M, 9 Mar 1968.

*Diagnosis.*—Distolateral flange broadly rounded, without carinae; apical arm very short, apically spiculate, tip emarginate (Fig. 177); posterior gonopod with mesal projection of coxal endite short, blunt (Fig. 178); cyphopod valves slightly unequal, lateral extending into short, broad, caudal lobe (Fig. 203).

*Distribution.*—Mendocino and Humboldt counties, California. In addition to the types, the following three samples were examined:

*Humboldt Co.*, Eureka, M, 8 F, date unknown, H. S. Barber (NMNH); 3.7 mi N Garberville, F, 9 Mar 1968 (UCD). *Mendocino Co.*, 4.1 mi SW Leggett, M, F, 17 Feb 1967, V. Roth (AMNH).

*Remarks.*—The specimens from Mendocino County were collected in mixed redwood litter.

***Caseya heteropa montana*, NEW SUBSPECIES**  
(Figs. 179–183, 205)

*Type specimens.*—Male holotype and four male and 12 female paratypes (UCD) collected by J. S. Buckett and M. R. Gardner, 28 November 1964, 6 mi S El





Figure 224. Distributions of *Caseya* and *Speoseya* in California. Solid hexagon, *C. guttata*; open hexagon, *C. paradoxa*; dots, *C. h. heteropa*; circles, *C. heteropa disjuncta*; open triangles, *C. heteropa oraria*; solid triangles, *C. heteropa montana*; solid diamonds, *C. longiloba*; open diamonds, *C. coxalis*; oval, *C. shastensis*; open stars, *C. bucketti*; solid stars, *C. sequoia*; solid squares, *C. dorada*; open squares, *C. prionota*; asterisk, *C. occidentalis*; half-shaded dots, *C. taliae*; stars in dots, *C. similis*. The arrow points to the area of the type locality of *Speoseya grahami*.

Dorado, El Dorado Co., CA. Other paratypes as follows, collected by J. S. Buckett, M. R. Gardner, and assistants except where indicated. *Colusa Co.*, 3.5 mi N Leesville, M, 22 Dec 1965 (UCD); 5 mi W Stonyford, F, 22 Dec 1965 (UCD). *Butte Co.*, along Dry Creek Rd., 14 mi N Oroville, M, 2 Mar 1956, R. O. Schuster (CIS). *Amador Co.*, Pine Grove, F, 4 Mar 1971, R. F. Wilkey (UCD). *Calaveras Co.*, 7 mi NE Copperopolis, 6 M, 11 F, 12 Nov 1966 (UCD); 2 mi NW Mokelumne Hill, 2 F, 27 Dec 1965 (UCD). *Tuolumne Co.*, Moccasin Cr. Fish Hatchery near Moccasin, 2 M, 3 F, 1 Dec 1967 (UCD). *Mariposa Co.*, 1 mi E Briceburg, 2 M, 4 F, 2 Dec 1967 (UCD); 14.1 mi E Briceburg, F, 8 Feb 1968 (UCD); 12 mi N Bear Valley, 4 M, 9 F, 1 Dec 1967 (UCD).

*Diagnosis.*—Distolateral flange of colpocoxite variable, smooth, lightly striate, or spiculate, margin entire or sharply acute; apical arm short and variable, with or without spicules, margin rounded, irregular, or outer corner produced (Figs. 179, 182, 183); posterior gonopod with mesal projection of coxal endite variably produced and rounded (Figs. 180, 181); cyphopod valves subequal (Fig. 205).

*Distribution.*—Known only from the type and paratype localities along the

western slope of the Sierra Nevada Mountains from Mariposa to Butte counties, extending westward into the northern Sacramento Valley.

*Caseya similis* Causey  
(Figs. 212–214)

*Caseya similis* Causey, 1952:113–114, figs. 6–7; Chamberlin and Hoffman, 1958: 88; Loomis, 1966:225–226.

*Type specimen.*—Male holotype (NMNH) collected by O. F. Cook, 15 February 1929, beside Clear Creek at Tehachapi Pass, Kern Co., CA.

*Diagnosis.*—Characterized by broad, apically rounded lateral ramus, about half as long as apical arm; shorter, narrower, acuminate mesal ramus; colpocoxite curving broadly caudad, apical arm curving dorsad, narrowing then expanding slightly, bisinuate, apically acute.

*Color.*—Dorsum dark with depigmented areas around setae.

*Male holotype.*—Facial setae sparse. Ocellaria with rows of 6, 6, 5, 4, and 2 ocelli. Relative proportions of antennomeres 1.5, 2.5, 1.0, 2.0, 3.5, 0.5.

Pleurotergite 3–4 with ventral margins rounded. Specimen fragmented, length unknown.

Gonapophysis extending to level of femur, tapering distad. Leg 3 coxa with subconical distal lobe. Leg 7 coxa with flattened area on medial side at midlength.

Anterior gonopod colpocoxite (Fig. 212) curving broadly caudad, apical arm curving dorsad, narrowing, then expanding slightly, outer corner prolonged, bisinuate, and apically acute; lateral ramus moderately long and broad, about half as long as apical arm, narrowing slightly at midlength, apically rounded; mesal ramus shorter than lateral, curving dorsad, narrowing rapidly to acuminate tip; flagellar carina narrow, complete. Flagella parallel. Lateral lamina moderately broad basally, narrowing to level of division, branches parallel and subequal, anterior branch expanding near midlength then tapering to subacuminate tip, caudal branch tapering evenly and smoothly to acuminate tip. Mesal lamina relatively small, with two short projections, curving caudad. Telopodite relatively narrow basally, expanding along caudal margin into truncate projection; intermediate septum moderately broad.

Posterior gonopod coxal endite (Fig. 213) moderately broad, divided near midlength into broad, apically flattened mesal, and narrow, apically rounded lateral branches, lengths subequal. Telopodite without marginal rims. Leg 10 coxa with short, truncate mesal projection.

*Female from Los Angeles.*—Cyphopod valves subequal, with slight caudal and ventral lobes, former rounded, latter truncate (Fig. 214).

*Distribution.*—Kern and Los Angeles counties, California. The following samples were examined in addition to the holotype:

*Kern Co.*, Woodford, F, 31 Jan 1928, O. F. Cook (NMNH). *Los Angeles Co.*, F, site and collector unknown, 31 Dec 1932 (NMNH); Los Angeles, F, Jun 1931, Stermsky (NMNH); Millard Canyon, Angeles Nat. For., F, 8 Nov 1983, R. M. Shelley, C. L. Hogue, and K. Dobry (NCSM).

*Remarks.*—Loomis (1966) reported a second male of *C. similis* from Woodford, Kern Co., collected by O. F. Cook, 8 Jan 1928, which the junior author could not locate in the NMNH during visits in 1986 and 1987. Loomis reported that

the second legs of this male were not smaller than the first and third pairs, but the second legs on the holotype are smaller than the third pair.

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#### ADDENDUM

As the manuscript was going to press, we learned that the male holotype and female paratype of *O. siliquae* at the NMNH will be transferred to the CAS in exchange for a paratype of each sex at this institution. Thus in accordance with Causey (1963), the holotype will be at the CAS, along with 2 male, 3 female, and 2 juvenile paratypes.

S. I. Golovatch [1980, New forms of Diplopoda from the Soviet Far East and their zoological relationships, *Zool. Zh.*, 59:199–207 (in Russian)] described *U. kurtschevae*, the only caseyid known from outside North America, from Hokkaido Island, Japan, and the Amur Region of Siberia and the Kamchatka Peninsula, U.S.S.R. He also published a generalized distribution map of the family showing the approximate area of the western Nearctic fauna. Thus, *Underwoodia* contains two species, which clearly demonstrate a trans-Beringian connection, and at this writing, the family composition is 45 species.